ESTABLISHMENT OF 132kV GRID CONNECTION INFRASTRUCTURE FOR THE WOODHOUSE 1 AND WOODHOUSE 2 SOLAR ENERGY FACILITIES, NORTH WEST PROVINCE

Basic Assessment Report

DFFE Reference No.: 14/12/16/3/3/1/2396

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PROJECT DETAILS

DEFF Reference No.	:	14/12/16/3/3/1/2396
Title	:	Establishment of 132kV Grid Connection Infrastructure for the Woodhouse 1 and Woodhouse 2 Solar Energy Facilities, North West Province
Authors	:	Jana de Jager Rendani Rasivhetshele Karen Jodas
Applicant	:	Genesis Eco-Energy Developments
Report Status	:	Draft for Public Review
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PURPOSE OF THE EIA REPORT AND INVITATION TO COMMENT

Genesis Eco-Energy Developments (Pty) Ltd proposes the construction and operation of a 132kV power line, switching station and collector substation to connect the authorised Woodhouse Solar 1 and Woodhouse Solar 2 PV energy facilities to the Eskom grid via the existing Bophirima Substation. The BA process is being undertaken in accordance with the requirements of the 2014 EIA Regulations promulgated in terms of the National Environmental Management Act (NEMA; Act No. 107 of 1998). This Basic Assessment (BA) report has been compiled in accordance with Appendix 1 of the EIA Regulations, 2014 (as amended) and consists of the following sections:

This Basic Assessment (BA) Report (hereafter referred to as the BA Report) consists of the following sections:

- **Chapter 1** provides background to the proposed Woodhouse Solar PV Grid Connection solution and the basic assessment process.
- **Chapter 2** provides a description of the project details and identified project alternatives.
- **Chapter 3** outlines the strategic regulatory and legal context for energy planning in South Africa and specifically for the grid connection.
- **Chapter 4** describes the need and desirability for the development of the Woodhouse Solar Grid Connection within the grid connection corridor.
- **Chapter 5** outlines the approach to undertaking the basic assessment process
- **Chapter 6** describes the existing biophysical and social environment within and surrounding the grid connection corridor proposed for the development
- **Chapter 7** provides an assessment of the potential issues and impacts associated with the development of the grid connection solution and presents recommendations for the mitigation of significant impacts.
- **Chapter 8** provides an assessment of the potential for cumulative impacts
- **Chapter 9** presents the conclusions and recommendations based on the findings of the BA Report
- **Chapter 10** provides references used in the compilation of the BA Report

The BA Report is available for review from Monday, 6 September to Thursday 7 October 2021 at the following locations https://savannahsa.com/public-documents/grid-infrastructure/

Please submit your comments by **Thursday, 7 October 2021** to:
Tumelo Mathulwe PO Box 148, Sunninghill, 2157 Tel: 011-656-3237 Fax: 086-684-0547 Email: publicprocess@savannahsa.com

Comments can be made as written submission via fax, post or email.

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EXECUTIVE SUMMARY

Genesis Eco-Energy Developments (Pty) Ltd proposes the construction and operation of a 132kV power line, switching station and collector substation to connect the authorised Woodhouse Solar 1 and Woodhouse Solar 2 PV energy facilities to the Eskom grid via the existing Bophirima Substation.

The grid connection corridor is located approximately 5.5km southeast of the town of Vryburg in the Naledi Local Municipality and Dr Ruth Segomotsi Mompati District Municipality, and comprises the following 5 affected properties:

- Farm Waterloo 992
- Portion 2 of Farm Woodhouse 729
- Portion 2 of the Farm Bernauw 674
- Remaining Extent of Portion 56 of the Farm Bernauw 674
- Remaining Extent of Farm Woodhouse 729 / Eskom Servitude Area

The development of the grid connection infrastructure is required in order to connect the authorised Woodhouse Solar 1 PV and Woodhouse Solar 2 PV energy facilities to the Eskom grid via the existing Bophirima Substation.

The grid connection infrastructure will be located within a grid connection corridor, and will consist of the below associated infrastructure:

- 132kV switching substation (footprint up to 1ha)
- 132kV power line (within 200m wide corridor)
- Collector substation (footprint up to 1ha)
- 33kV underground cables to connect to the Solar PV energy facilities' substations
- Access roads to substation sites and service tracks (up to 4m wide) where no existing roads are available.

Two alternative Collector substation positions are considered as part of this assessment. As such, the 200m wide power line corridor is shared/common for the bulk of its length, and deviates only to accommodate these two alternative positions for the Collector substation. This assessment, therefore, considers two alternative grid connection solutions, both originating at the same point, and terminating at Bophirima Substation. The alternative grid connection configurations assessed include:

Grid Connection Alternative 1: A 132kV switching substation located north of the authorised Woodhouse 2 Solar facility, as well as a 132kV power line, positioned to the western side of the Amalia main road, which feeds to Collector Substation Alternative 1. The Collector Substation Alternative 1 is located west of the authorised Woodhouse 1 Solar facility. A 132kV power line will run east from Collector Substation Alternative 1 to connect at Bophirima Substation. The connection to Bophirima Substation will be at the eastern side of the substation via a 132kV underground power line within the Eskom Servitude Area.

Grid Connection Alternative 2: A 132kV switching substation located north of the authorised Woodhouse 2 Solar facility, as well as a 132kV power line, positioned to the western side of the Amalia main road, which feeds to Collector Substation Alternative 2. The Collector Substation Alternative 2 is located north of the authorised Woodhouse 1 Solar facility. A 132kV power line will run from Collector Substation Alternative 2

south to connect to Bophirima Substation. The connection to Bophirima Substation will be at the eastern side of the substation via a 132kV underground power line within the Eskom Servitude Area.

No environmental fatal flaws were identified in the detailed specialist studies conducted, and no impacts of unacceptable significance are expected to occur with the implementation of the recommended mitigation measures. These measures include, amongst others, the avoidance of sensitive features and the undertaking of monitoring, as specified by the specialists.

The potential environmental impacts associated with the grid connection infrastructure identified and assessed through the BA process include:

» Impacts on ecology (terrestrial and freshwater).
» Impacts on avifauna.
» Impacts on heritage resources, including archaeology and palaeontology.
» Visual impacts on the area as a result of the grid connection infrastructure.

Impacts on Ecology (Terrestrial and Freshwater)

There are no highly sensitive features impacted by the Woodhouse Solar PVs Grid Connection corridor. However, it is recommended that the power line should be placed as close as possible to the Amalia gravel road and should span the identified small drainage system. From the findings of the Ecological Impact Assessment (**Appendix D**) it can be concluded that the grid connection corridor assessed for the development of the grid connection infrastructure is of moderate to low ecological sensitivity. As a result, there are no specific long-term impacts associated with the grid connection infrastructure that cannot be reduced to an acceptable level through mitigation and avoidance. There are no high residual impacts or fatal flaws associated with the development and it can be supported from a terrestrial ecology perspective.

Impacts on Avifauna

Given the level of degradation the level of degradation already present and the lower bird species diversity and abundance recorded in this area, and placement of infrastructure to areas where existing impacts occur (i.e., placing the proposed power line alongside roads), the impacts of the grid connection on avifauna are likely to be of moderate to low significance and no impacts of high significance are expected, with the implementation of mitigation measures.

Impacts on Heritage Resources (including archaeology and palaeontology)

The Heritage Impact Assessment (**Appendix E**) assessed the impact of the grid connection infrastructure on the heritage features (archaeology, palaeontology and cultural landscape) associated with the assessed grid connection corridor.

Nine archaeological sites of low scientific significance (grade IIIC) were identified within the development corridor. Impacts to archaeological and heritage resources are expected to occur during the construction phase of the project, most likely during foundation excavations. However, with the implementation of mitigation measures, the impact to these identified resources is expected to be of Low significance. There are no fatal flaws expected to occur with regards to archaeological resources.

No impact to significant palaeontological heritage is anticipated, and the impact to paleontological resources is expected be of Low significance with and without the implementation of mitigation measures. It is recommended that no additional specialist palaeontological assessment is required.

Visual Impacts

The Visual Impact Assessment (**Appendix F**) identified negative impacts on visual receptors during the construction and the operation phases of the grid connection infrastructure. The impacts include visual impacts due to construction activities, as well as impacts on sensitive visual receptors located within 0.5km to 3km from the grid connection infrastructure, and a visual impact on the sense of place. The Visual Impact Assessment concluded that the visual impact of all grid connection infrastructure will have a low visual impact on observers traveling along the roads and residents of homesteads within a 1.5 - 3km radius of the infrastructure. Furthermore, the anticipated visual impact of the proposed grid connection infrastructure on the regional visual quality (i.e. beyond 3km of the proposed infrastructure), and by implication, on the sense of place, is generally expected to be of low significance.

Assessment of Cumulative Impacts

Based on the specialist cumulative assessment and findings, the development of the Woodhouse Solar PVs grid connection infrastructure and its contribution to the overall impact of all existing grid infrastructure to be developed, it can be concluded that the contribution of the project to cumulative impacts will be of a low to medium significance depending on the impact being considered. There are, however, no impacts or risks identified to be of a high significance or considered as unacceptable with the development of the proposed grid connection infrastructure within the assessed grid connection corridor. In addition, no impacts that will result in whole-scale change are expected to occur.

Consideration of Alternatives

Two alternative collector substation positions were considered as part of this assessment. As such, the 200m wide power line corridor is shared/common for the bulk of its length and deviates only to accommodate these two alternative positions for the Collector substation. This assessment, therefore, considered two alternative grid connection solutions, both originating at the same point, and terminating at Bophirima Substation. As part of specialist assessments both alternative grid connection solutions were assessed and determined to be acceptable from an environmental perspective. A summary of the assessment of impacts for the grid connection and associated infrastructure alternatives are detailed below:

Aspect	Grid Connection Alternative 1	Grid Connection Alternative 2
Ecology	*Preferred & Acceptable*	*Acceptable*
Avifauna	*Preferred & Acceptable*	*Acceptable*
Heritage	*Preferred & Acceptable*	*Acceptable*
Visual	*Acceptable*	*Preferred & Acceptable*

Grid Connection Alternative 1 was identified by the developer as the preferred alternative from a technical feasibility perspective and has been fully considered and assessed as part of this BA process and within this BA Report to be acceptable from an environmental perspective.

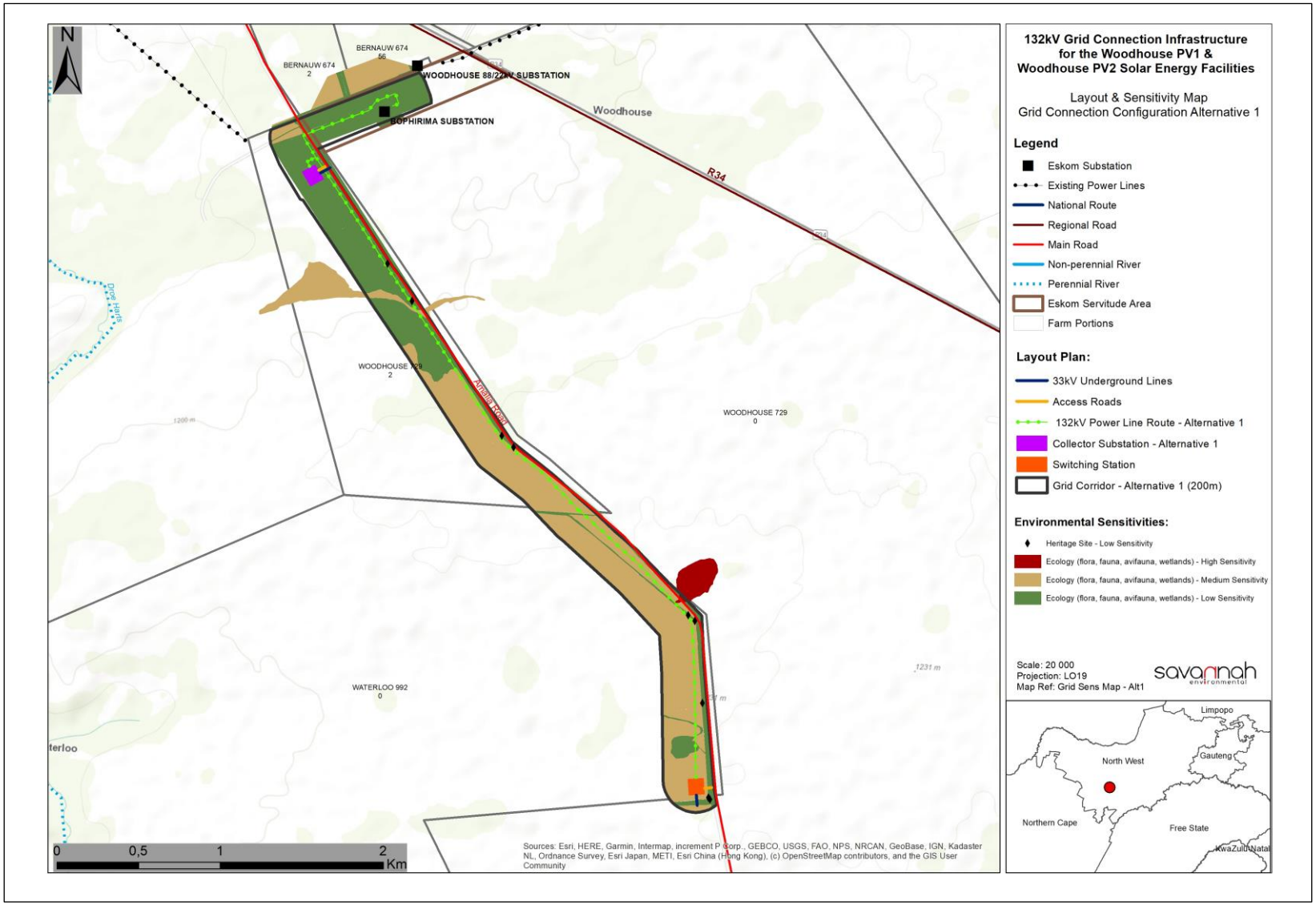

Figure 1: Environmental sensitivity map overlain with the layout of the preferred grid connection corridor alternative (Grid Corridor Alternative 1) (**Appendix L)**

DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Archaeological material: Remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Emergency: An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:

i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment, as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Indirect impacts: Indirect or induced changes that may occur because of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place because of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Method statement: A written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

Mitigation hierarchy: The mitigation hierarchy is a framework for managing risks and potential impacts related to biodiversity and ecosystem services. The mitigation hierarchy is used when planning and implementing development projects, to provide a logical and effective approach to protecting and

conserving biodiversity and maintaining important ecosystem services. It is a tool to aid in the sustainable management of living, natural resources, which provides a mechanism for making explicit decisions that balance conservation needs with development priorities.

No-go areas: Areas of environmental sensitivity that should not be impacted on or utilised during the development of a project as identified in any environmental reports.

Perennial and non-perennial: Perennial systems contain flow or standing water for all or a large proportion of any given year, while non-perennial systems are episodic or ephemeral and thus contains flows for short periods, such as a few hours or days in the case of drainage lines.

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

Pre-construction: The period prior to the commencement of construction, this may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Riparian: the area of land adjacent to a stream or river that is influenced by stream-induced or related processes. Riparian areas which are saturated or flooded for prolonged periods would be considered wetlands and could be described as riparian wetlands. However, some riparian areas are not wetlands (e.g. an area where alluvium is periodically deposited by a stream during floods but which is well drained).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Waste: means—

a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or
b) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister

Watercourse: as per the National Water Act means -

(a) a river or spring;
(b) a natural channel in which water flows regularly or intermittently;

(c) a wetland, lake or dam into which, or from which, water flows; and
(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks

Wetlands: land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil (Water Act 36 of 1998); land where an excess of water is the dominant factor determining the nature of the soil development and the types of plants and animals living at the soil surface (Cowardin et al., 1979).

ACRONYMS

BA	Basic Assessment
BGIS	Biodiversity Geographic Information System
CBA	Critical Biodiversity Area
DFFE	Department of Forestry, Fisheries, and the Environment (National)
DWS	Department of Water and Sanitation
CBA	Critical Biodiversity Area
CR	Critically Endangered
CSIR	Council for Scientific and Industrial Research
DM	District Municipality
DMRE	Department of Mineral Resources Energy
EAP	Environmental Assessment Practitioner
EGIS	Environmental Geographic Information System
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EN	Endangered
EP	Equator Principles
ESA	Ecological Support Area
GA	General Authorisation
GHG	Greenhouse Gas
IBA	Important Bird Area
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IEP	Integrated Energy Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature
I&AP	Interested and Affected Party
km	Kilometre
kWh	Kilowatt hour
LC	Least Concern
LM	Local Municipality
LNG	Liquid Natural Gas
m	Metre
m^2	Square meters
m^3	Cubic meters
m amsl	Metres Above Mean Sea Level
MW	Megawatts
NDP	National Development Plan
NEMA	National Environmental Management Act (No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act (No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act (No. 10 of 2004)

NEM:WA	National Environmental Management: Waste Act (No. 59 of 2008)
NFA	National Forests Act (No. 84 of 1998)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act (No. 25 of 1999)
NT	Near Threatened
NWA	National Water Act (No. 36 of 1998)
ONA	Other Natural Area
PA	Protected Area
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SAIAB	South African Institute for Aquatic Biodiversity
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
TOPS	Threatened or Protected Species
VU	Vulnerable

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APPENDICES LIST

CHAPTER 1 INTRODUCTION

Genesis Eco-Energy Developments (Pty) Ltd proposes the construction and operation of a 132kV power line, switching station and collector substation to connect the authorised Woodhouse Solar 1 and Woodhouse Solar 2 PV energy facilities to the Eskom grid via the existing Bophirima Substation.

The nature and extent of the grid connection corridor, as well as the potential environmental impacts associated with the construction, operation, and decommissioning phases of infrastructure of this nature are explored in detail in this Basic Assessment Report. Site specific environmental issues and constraints within the grid connection corridor are considered within independent specialist studies in order to test the environmental suitability of the corridor for the development of the grid connection infrastructure. Two alternative collector substation and grid line alignments are considered in this Basic Assessment and a preferred alternative is nominated.

This Basic Assessment (BA) Report (hereafter referred to as the BA Report) consists of the following sections:

- **Chapter 1** provides background to the proposed Woodhouse Solar PV Grid Connection solution and the basic assessment process.
- **Chapter 2** provides a description of the project details and identified project alternatives.
- **Chapter 3** outlines the strategic regulatory and legal context for energy planning in South Africa and specifically for the grid connection.
- **Chapter 4** describes the need and desirability for the development of the Woodhouse Solar Grid Connection within the grid connection corridor.
- **Chapter 5** outlines the approach to undertaking the basic assessment process
- **Chapter 6** describes the existing biophysical and social environment within and surrounding the grid connection corridor proposed for the development
- **Chapter 7** provides an assessment of the potential issues and impacts associated with the development of the grid connection solution and presents recommendations for the mitigation of significant impacts.
- **Chapter 8** provides an assessment of the potential for cumulative impacts
- **Chapter 9** presents the conclusions and recommendations based on the findings of the BA Report
- **Chapter 10** provides references used in the compilation of the BA Report

1.1 Overview of the Woodhouse Solar PVs Grid Connection Infrastructure

The Woodhouse Solar 1 and Woodhouse Solar 2 facilities were authorised in 2016 (DEA ref no 14/12/16/3/3/2/863 and 14/12/16/3/3/2/865 respectively). The facilities are located on Farm Remaining Extent of Farm Woodhouse 729, located immediately south of the Eskom Bophirima Substation. The proposed infrastructure is considered to be the preferred grid connection solution for the Woodhouse Solar 1 and Woodhouse Solar 2 facilities, is in line with the Cost Estimate Letter (CEL) provided by Eskom, and includes the development of specific grid connection infrastructure in order to enable the connection. The infrastructure includes:

- 132kV Switching station (footprint up to 1ha)
- 132kV power line (within 200m wide corridor)
- Collector substation (footprint up to 1ha)

- 33kV underground cables to connect to the Solar PV energy facilities' substations
- Access roads to substation sites and service tracks (up to 4m wide) where no existing roads are available.

Two alternative Collector substation positions are considered as part of this assessment. As such, the 200m wide power line corridor is shared/common for the bulk of its length and deviates only to accommodate these two alternative positions for the Collector substation. This assessment, therefore, considers two alternative grid connection solutions, both originating at the same point, and terminating at Bophirima Substation. The key infrastructure components proposed as part of the project, as well as the two alternative grid connection configurations are described in greater detail in Chapter 2 of this BA Report.

The grid connection corridor is located approximately 5.5km southeast of the town of Vryburg in the Naledi Local Municipality and Dr Ruth Segomotsi Mompati District Municipality, and comprises the following 5 affected properties[1]:

- Farm Waterloo 992
- Portion 2 of Farm Woodhouse 729
- Portion 2 of the Farm Bernauw 674
- Remaining Extent of Portion 56 of the Farm Bernauw 674
- Remaining Extent of Farm Woodhouse 729 / Eskom Servitude Area

Details of the grid connection corridor within which the grid connection infrastructure will be developed is included in **Table 1.1**. **Figure 1.1** provides a locality map of the grid connection corridor, as well as the positions of the substation alternatives.

Table 1.1: A detailed description of the grid connection corridor for the development of the Woodhouse Solar PV Grid Connection solution

Province	North West Province
District Municipality	Dr Ruth Segomotsi Mompati District Municipality
Local Municipality	Naledi Local Municipality
Ward number(s)	Ward 5
Nearest town(s)	Vryburg (10km), Huhundi, Delareyville, Stella, Schweizer-Reneke
Affected Properties: Farm name(s), number(s) and portion numbers	Farm Waterloo 992 Portion 2 of Farm Woodhouse 729 Portion 2 of the Farm Bernauw 674 Remaining Extent of Portion 56 of the Farm Bernauw 674 Remaining Extent of Farm Woodhouse 729 / Eskom Servitude Area
SG 21 Digit Code (s)	T0IN00000000099200000 T0IN00000000072900002 T0IN00000000067400002 T0IN00000000067400056 T0IN00000000072900000
Current zoning and land use	Agricultural and special use (energy generation)

1 The 200m wide grid connection corridor traverses limited sections of the 5 affected properties. This is a comprehensive listing of these properties.

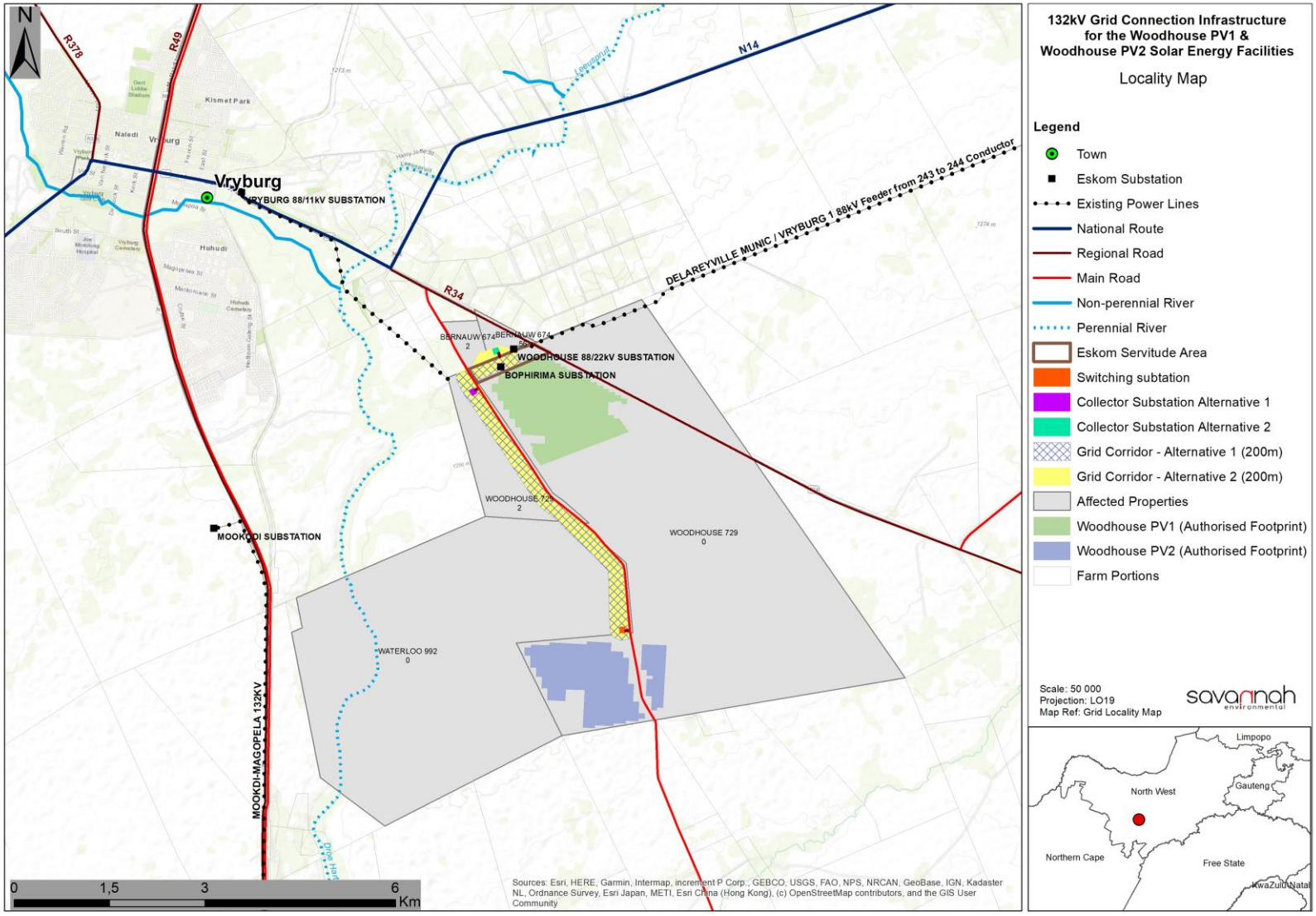

Figure 1.1: A locality map illustrating the grid connection corridor under investigation for the establishment of the Woodhouse Solar PVs Grid Connection

1.2 Requirements for an Environmental Impact Assessment Process

The construction and operation of Woodhouse Solar PVs Grid Connection is subject to the requirements of the EIA Regulations, 2014 (as amended), published in terms of Section 24(5) of the National Environmental Management Act (NEMA) 107 of 1998. NEMA is the national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the Competent Authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation.

The development (i.e. construction and operation) of the grid connection is subject to the requirements of the Environmental Impact Assessment (EIA) Regulations of 2014 published in terms of Section 24(5) of NEMA. In terms of the EIA Regulations of 2014 (as amended) promulgated under Sections 24 and 24D of the NEMA, various aspects of the project are listed as activities that may have a detrimental impact on the environment. The main listed activity triggered by the proposed grid connection infrastructure is Activity 11(i) of Listing Notice 1 (GNR327 of the EIA Regulations, 2014 (as amended)), which relates to the development of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts (kV).

Due to the triggering of Activity 11(i) of Listing Notice 1, of the EIA Regulations, 2014 (as amended), a Basic Assessment process must be undertaken in order to obtain Environmental Authorisation for the construction and operation of the Woodhouse Solar PV Grid Connection solution. The grid connection corridor is also located within the northern corridor of the Strategic Transmission Corridors and the Vryburg Renewable Energy Development Zone (REDZ 6), gazetted on 16 February 2018 (GNR113 and GNR114). These transmission corridors are considered to be of strategic importance for the rollout of the supporting large scale electricity transmission and distribution infrastructure in terms of Strategic Integrated Project 10: Electricity Transmission and Distribution.

Genesis Eco-Energy Developments (Pty) Ltd appointed Savannah Environmental as the independent environmental consultant to conduct the BA process for the grid connection solution. This BA Report is in line with Appendix 1 of the EIA Regulations, 2014 (as amended).

A BA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be forewarned of potential environmental issues and allows for resolution of the issues reported on in the BA Report as well as dialogue with interested and affected parties (I&APs).

The BA process comprises of one phase and involves the identification and assessment of environmental impacts through specialist studies, as well as public participation. The process followed in the BA involves a detailed assessment of potentially significant positive and negative impacts (direct, indirect, and cumulative). This includes detailed specialist investigations and one round of public consultation. Following

the public review period of the BA Report and Environmental Management Programme (EMPr[2]), a final BA Report and an EMPr is submitted to the Competent Authority, which includes the recommendations for practical and achievable mitigation and management measures for final review and decision-making.

The need to comply with the requirements of the EIA Regulations ensures that the competent authority is provided with the opportunity to consider the potential environmental impacts of a project early in the project development process and to assess if potential environmental impacts can be avoided, minimised or mitigated to acceptable levels.

In terms of GNR 779 of 01 July 2016, the National Department of Forestry, Fisheries, and the Environment (DFFE) has been determined as the Competent Authority for all projects which relate to the Integrated Resource Plan for Electricity (IRP) 2010 – 2030, and any updates thereto. Through the decision-making process, the DFFE will be supported by the North West Department of Rural, Environment and Agricultural Development (READ) as a commenting authority.

1.3 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This BA Report has been prepared in accordance with the requirements of the EIA Regulations published on 08 December 2014 (as amended) promulgated in terms of Chapter 5 of the National Environmental Management Act (Act No 107 of 1998).

This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of basic assessment reports:

Requirement	Relevant Section
3(a) the details of the (i) EAP who prepared the report and (ii) the expertise of the EAP, including a curriculum vitae.	The details of the EAP who prepared the report and the expertise of the EAP is included in section 1.5. The curriculum vitae of the EAP, project team and independent specialists are included in **Appendix A**.
3(b) the location of the activity including (i) the 21-digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties.	The location of the grid connection corridor, within which the 132kV power line and collector substations will be developed, is included in section 1.1, **Table 1.1** and **Figure 1.1**. The information provided includes the 21-digit Surveyor General code of the affected properties and the farm names. Additional information is also provided regarding the location of the development which includes the relevant province, local and district municipalities, ward and current land zoning.

[2] The generic Environmental Management Programmes, contemplated in Regulation 19(4) of the EIA Regulations, 2014 (as amended) and as per GNR 435 of 22 March 2019 is used for the BA for the Woodhouse Solar PVs Grid Connection. This is due to the triggering of activity 11 of Listing Notice 1 of the EIA Regulations, 2014 (as amended). The generic EMPr for substation infrastructure for electricity transmission and distribution and the generic EMPr for overhead electricity transmission and distribution infrastructure is included as **Appendix G to I** of this BA Report.

1.4 Objectives of the Basic Assessment Process

Appendix 1 of the EIA Regulations, 2014 (as amended), contains the objectives to be achieved through the undertaking of a BA process. The following objectives have been considered, undertaken and achieved through a consultative process within this BA Report for the Woodhouse Solar PVs Grid Connection:

- The identification and consideration of the policies and legislative context associated with the location of the grid connection solution (i.e. grid connection corridor) and the manner in which the proposed development complies with and responds to the relevant policies and legislative context.
- The identification and consideration of feasible alternatives associated with the Woodhouse Solar PVs Grid Connection that relate to the specific proposed activity and the location of where the development is proposed.
- The consideration of the need and the desirability of the Woodhouse Solar PVs Grid Connection considering the alternatives identified, including the desirability for the development within the identified grid connection corridor.
- The identification and consideration of the nature, consequence, extent, duration and probability of the impacts associated with the Woodhouse Solar PVs Grid Connection, as well as the degree to which the impacts can be reversed, result in irreplaceable loss of resources and be avoided, managed or mitigated.
- Motivation for the preferred alternative (i.e. collector substation and it's grid connection corridor) and proposed activity.
- Consideration and identification of the environmental sensitivities to provide input in terms of measures to avoid, manage and mitigate the impacts and the residual risks that need to be managed and monitored.

The potential environmental impacts associated with the construction, operation and decommissioning phases of infrastructure associated with the Woodhouse Solar PVs grid connection solution are explored in detail in this Basic Assessment Report. Site specific environmental issues and constraints within the assessed corridor are considered within independent specialist studies in order to test the environmental suitability of the corridor for the development of the proposed grid connection solution. The additional objective of the specialist studies is to also delineate areas of sensitivity within the corridor, and ultimately inform the placement of the substations, power line and associated infrastructure with the assessed corridor.

The release of the BA Report for a 30-day review period will provide stakeholders with an opportunity to review and provide input in terms of potential issues and concerns that may be associated with the establishment of the Woodhouse Solar PVs Grid Connection. The final BA Report for submission to the DFFE will consider and incorporate all issues, concerns and responses raised during the review period of the BA Report. The DFFE will also consider these issues, concerns and responses in their decision-making of the application for Environmental Authorisation.

1.5 Details of the Environmental Assessment Practitioner and Expertise to conduct the BA process

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326), Genesis Eco-Energy Developments (Pty) Ltd has appointed Savannah Environmental (Pty) Ltd (Savannah Environmental) as the independent Environmental Assessment consultant to undertake the Basic Assessment and prepare the BA Report for the proposed Woodhouse Solar PVs Grid Connection solution. Neither Savannah Environmental nor any of its specialists are subsidiaries of, or are affiliated to Genesis Eco-Energy Developments (Pty) Ltd. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a specialist environmental consulting company providing a holistic environmental management service, including environmental assessment and planning to ensure compliance and evaluate the risk of development, and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental team have considerable experience in basic assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects throughout South Africa, including those associated with electricity generation.

- ***Rendani Rasivhetshele*** is the author of this report. She is a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA), and she holds a Bachelor of Science Honours in Environmental Management. She has over 4 years of experience in conducting Environmental Impacts Assessments, public participation, and Environmental Management Programme, for a wide range of projects, including renewable energy projects (wind and solar).
- ***Jana de Jager*** is the co-author of this report. She holds an Honours Degree in Environmental Science and has 4 years of experience in the environmental field. Her key focus is on environmental impact assessments, public participation, environmental management plans and programmes, as well as mapping using ArcGIS for a variety of environmental projects.
- ***Tumelo Mathulwe*** is responsible for the public participation process for the BA. He has 2.5 years experience in conducting social surveys as part of project co-ordination for Environmental Impact Assessment and Water Use Licenses. He has worked in local projects taking part in resettlement action strategy, social surveys and environmental training.
- ***Karen Jodas*** is the registered EAP for the project and is Director at Savannah Environmental (Pty) Ltd. Karen holds a Master of Science Degree and is registered as a Professional Natural Scientist (400106/99) with the South African Council for Natural Scientific Professions (SACNASP). She has gained extensive knowledge and experience on potential environmental impacts associated with electricity generation and transmission projects through her involvement in related EIA processes over the past 20 years. She has successfully managed and undertaken EIA processes for infrastructure development projects throughout South Africa.

In order to adequately identify and assess potential environmental impacts associated with the proposed Woodhouse Solar PVs Grid Connection, the following specialist consultants have provided input into this BA Report:

Company	Specialist Area of Expertise	Specialist Name
Nkurenkuru Ecology & Biodiversity	Ecology and Freshwater	Gerhard Botha

Company	Specialist Area of Expertise	Specialist Name
LOGIS	Visual Impact Assessment	Lourens du Plessis
CTS Heritage	Heritage (including archaeology and palaeontology)	Jenna Lavin

Appendix A includes the curricula vitae for the environmental assessment practitioners from Savannah Environmental.

CHAPTER 2 PROJECT DESCRIPTION & ALTERNATIVES

This chapter provides an overview of the Woodhouse Solar PVs Grid Connection and details of the project scope, which includes the planning/design, construction, operation and decommissioning activities required for the development.

2.1. Legal Requirements as per the EIA Regulations, 2014 (as amended)

This chapter of the BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of BA reports:

Requirement	Relevant Section
3(b) the location of the activity including (i) the 21-digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	The location of the proposed Woodhouse Solar PV Grid Connection is detailed in Chapter 1, **Table 1.1**, as well as section 2.2.1 below.
3(c)(i)(ii) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or on land where the property has not been defined, the coordinates within which the activity is to be undertaken	A layout map illustrating the grid connection corridor (200m wide) within which the grid connection infrastructure is planned to be developed is included as **Figure 2.2** and **Figure 2.3**.
3(d)(ii) a description of the scope of the proposed activity, including a description of the activities to be undertaken including associated structures and infrastructure	A description of the activities to be undertaken with the development of the Woodhouse Solar PVs Grid Connection is included in **Table 2.1** and **Table 2.2**.
3(g) a motivation for the preferred site, activity and technology alternative;	A motivation for the preferred development area, activity and technology alternative is included in **section 2.2, 2.4, and 2.6.**
3(h)(i) details of all the alternatives considered;	The details of all alternatives considered are included in **section 2.4**.

2.2 Nature and extent of the Grid Connection for Woodhouse Solar PV facilities

2.2.1. Project Site

The grid connection corridor is located within the Naledi Local Municipality and Dr Ruth Segomotsi Mompati District Municipality and comprises the following 5 affected properties[3]:

- Farm Waterloo 992

3 The 200m wide grid connection corridor traverses limited sections of the 5 affected properties. This is a comprehensive listing of these properties.

- Portion 2 of Farm Woodhouse 729
- Portion 2 of the Farm Bernauw 674
- Remaining Extent of Portion 56 of the Farm Bernauw 674
- Remaining Extent of Farm Woodhouse 729 / Eskom Servitude Area

The grid connection infrastructure is distributed as follows on the affected properties:

Grid Connection Infrastructure	Farm Portion
132kV Switching Substation, underground 33kV cables, & 132kV Overhead Power Line	Farm Waterloo 992
132kV Overhead Power Line, Collector Substation Alt 1, underground 33kV cables, and Access Road	Portion 2 of Farm Woodhouse 729
Overhead Power Line	Portion 2 of the Farm Bernauw 674
Collector Substation Alt 2, 132kV Overhead Power Line, Access Road	Remaining Extent of Portion 56 of the Farm Bernauw 674
Underground Power Lines	Remaining Extent of Farm Woodhouse 729 / Eskom Servitude Area

The grid connection corridor is located within the Northern Corridor of the Strategic Transmission Corridors which is one of five corridors identified for the rollout of large-scale electricity transmission and distribution infrastructure. The grid connection corridor is also located within Zone 6 of the Renewable Energy Development Zones (REDZ), otherwise known as the Vryburg REDZ, which has been earmarked for the development of large scale solar photovoltaic energy facilities (refer to **Figure 2.1**)

Access to the grid connection corridor is possible via numerous existing roads in close vicinity to the corridor. Apart from these existing roads, gravel roads will also be utilised. Where no existing roads are available, access roads to the substation sites and service tracks will be constructed.

2.2.2. Components of the Grid Infrastructure for the Woodhouse Solar Grid Connection

The development of the grid connection infrastructure is required in order to connect the authorised Woodhouse Solar 1 PV and Woodhouse Solar 2 PV energy facilities to the Eskom grid via the existing Bophirima Substation.

The grid connection infrastructure will be located within a grid connection corridor, and will consist of the below associated infrastructure:

- 132kV switching substation (footprint up to 1ha)
- 132kV power line (within 200m wide corridor)
- Collector substation (footprint up to 1ha)
- 33kV underground cables to connect to the Solar PV energy facilities' substations
- Access roads to substation sites and service tracks (up to 4m wide) where no existing roads are available.

Two alternative Collector substation positions are considered as part of this assessment. As such, the 200m wide power line corridor is shared/common for the bulk of its length, and deviates only to accommodate these two alternative positions for the Collector substation. This assessment, therefore, considers two alternative grid connection solutions, both originating at the same point, and terminating at Bophirima Substation. The alternative grid connection configurations assessed include:

Grid Connection Alternative 1: A 132kV switching substation located north of the authorised Woodhouse 2 Solar facility, as well as a 132kV power line, positioned to the western side of the Amalia main road, which feeds to Collector Substation Alternative 1. The Collector Substation Alternative 1 is located west of the authorised Woodhouse 1 Solar facility. A 132kV power line will run east from Collector Substation Alternative 1 to connect at Bophirima Substation. The connection to Bophirima Substation will be at the eastern side of the substation via a 132kV underground power line within the Eskom Servitude Area.

Grid Connection Alternative 2: A 132kV switching substation located north of the authorised Woodhouse 2 Solar facility, as well as a 132kV power line, positioned to the western side of the Amalia main road, which feeds to Collector Substation Alternative 2. The Collector Substation Alternative 2 is located north of the authorised Woodhouse 1 Solar facility. A 132kV power line will run from Collector Substation Alternative 2 south to connect to Bophirima Substation. The connection to Bophirima Substation will be at the eastern side of the substation via a 132kV underground power line within the Eskom Servitude Area.

Figure 2.2 and **Figure 2.3** illustrates the alternative grid connection configurations proposed for the development of the Woodhouse Solar PVs Grid Connection.

A summary of the details and dimensions of the planned infrastructure associated with the project is provided in **Table 2.1.**

Table 2.1: Confirmed details or dimensions of the proposed Woodhouse Solar PVs Grid Connection[4]

Infrastructure	Footprint, dimensions and details
Corridor width (for assessment purposes)	A 200m wide grid connection corridor is assessed within which the grid connection infrastructure will be constructed and operated.
Power line capacity	132kV
Power line servitude width	Up to 32m
Length of the power line	Alternative 1: Up to 5.3km Alternative 2: Up to 5.7km
Height of the towers	Up to 36m
Switching substation footprint	Up to 1ha
Collector substation	Two alternative 132kV collector substation positions are proposed to connect the Woodhouse Solar 1 and 2 PV facilities to the Eskom electricity grid.
Collector substation capacity	132kV

[4] The confirmed details and dimensions of the Woodhouse Solar PVs Grid Connection was assessed as part of the independent specialist studies.

Collector Substation footprint	Up to 1ha
Access roads/ tracks	Access roads to substation sites and services tracks (up to 4m wide) where no existing roads are available.
Coordinates switching station (centre)	27° 1'14.38"S 24°48'35.07"E
Coordinates Collector Substation (centre)	Alternative 1: 26°59'16.38"S 24°47'3.84"E Alternative 2: 26°58'54.62"S 24°47'16.50"E
Coordinates of grid corridor alternative 1	Start: 27° 1'14.38"S 24°48'35.07"E Mid: 27° 0'7.24"S 24°47'48.78"E End: 26°59'1.42"S 24°47'20.18"E
Coordinates of grid corridor alternative 2	Start: 27° 1'14.38"S 24°48'35.07"E Mid: 27° 0'6.76"S 24°47'48.31"E End: 26°59'1.42"S 24°47'20.18"E

2.2.3. *Description of Project Alternatives*

» *Grid Connection Alternatives*

Two grid connection corridor alternatives have been identified by the developer. These alternatives both connect the Woodhouse Solar 1 and Woodhouse Solar 2 Developments to the Eskom grid via the Bophirima Substation. Refer to **Figure 2.2** and **Figure 2.3**.

The following technical considerations have been taken into account by the developer regarding the preferred grid connection alternative:

- The grid line lengths of Grid Route Alternative 1 are shorter and more cost efficient when compared to Grid Route Alternative 2.
- The position of the Collector Substation Alternative 1 is the preferred option and is desirable to Eskom as there are no existing infrastructure obstacles on the Eskom controlled servitude area. There are existing infrastructure obstacles on the Eskom servitude area when connecting from Collector Substation Alternative 2 to the Bophirima substation. In addition, Eskom does not recommend the Collector Substation Alternative 2 position due to there being existing overhead 132kV lines that runs across that area making it technically challenging and more expensive to connect across to the Bophirima Substation
- The position of the Collector Substation Alternative 1 was indicated and approved in the Eskom's Cost Estimate Letter (CEL) which Eskom had submitted to the developer.

Grid Connection Corridor Alternative 1 was therefore identified by the developer as the preferred alternative from a technical, financial and construction feasibility perspective. However, both grid connection corridor alternatives have been fully considered and assessed as part of this BA process and within this BA Report.

» *Collector Substation Location Alternatives*

Two alternative Collector Substation positions are considered as part of this assessment in order to cater for the grid connection solution for the two solar PV facilities.

As the function of the collector substations is to collect the generated power from the two Woodhouse solar PV facilities, the locations of the collector substations within the grid connection corridor is dependent on

the locations of the facility on-site substation[5]. Considering the dependency of the collector substation location on the solar PV facility on-site substations, two collector substation location alternatives are being assessed and considered as part of this BA process.

» *The 'do-nothing' Alternative*

The 'do-nothing' alternative is the option of Genesis Eco-Energy Developments (Pty) Ltd not constructing the grid connection infrastructure within the grid connection corridor. This would result in no environment or social impacts (positive or negative) as a result of the development of the switching substation, 132kV power line and collector substation within the corridor. This alternative is assessed in detail within Chapter 7 and Chapter 8 of this BA Report.

The main reasons why the 'do-nothing' alternative is not considered as a preferred alternative in relation to Woodhouse Solar PVs Grid Connection is related to the fact that the grid connection infrastructure is considered as specific required infrastructure in order to enable the evacuation of the generated power into the national grid from the Woodhouse Solar Development. Should the 'do-nothing' alternative be implemented for the grid connection infrastructure, it will result in the inability of Woodhouse Solar Development to efficiently connect to the national grid and therefore result in Woodhouse Solar Development not being viable for operation.

The option of not developing the grid connection solution required for Woodhouse Solar Development is not preferred.

[5] The collector substations will collect the generated power from the respective on-site facility substations associated with the respective solar PV facilities.

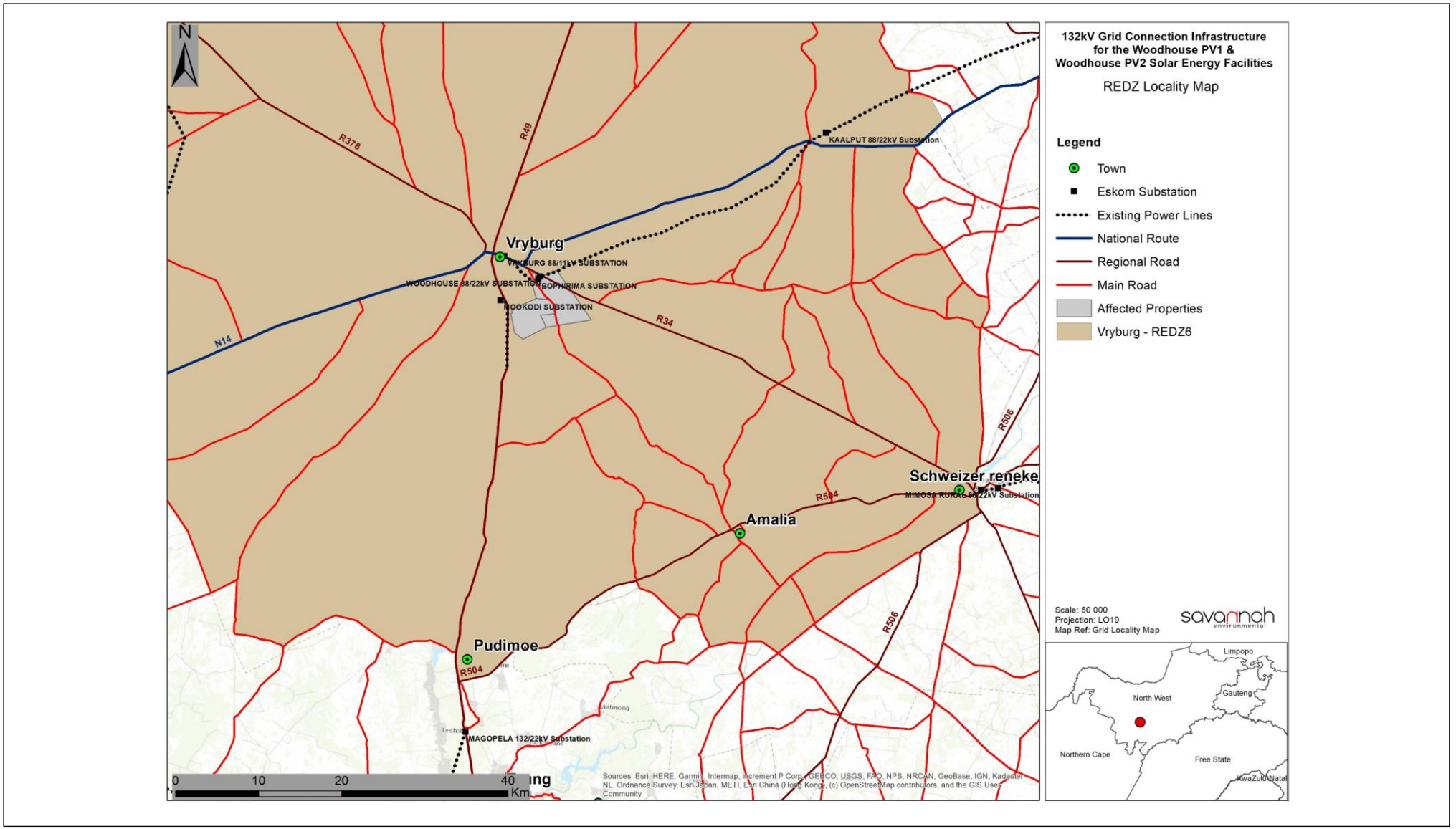

Figure 2.1: The location of the grid connection corridor Zone 6 of the Renewable Energy Development Zones (REDZ)

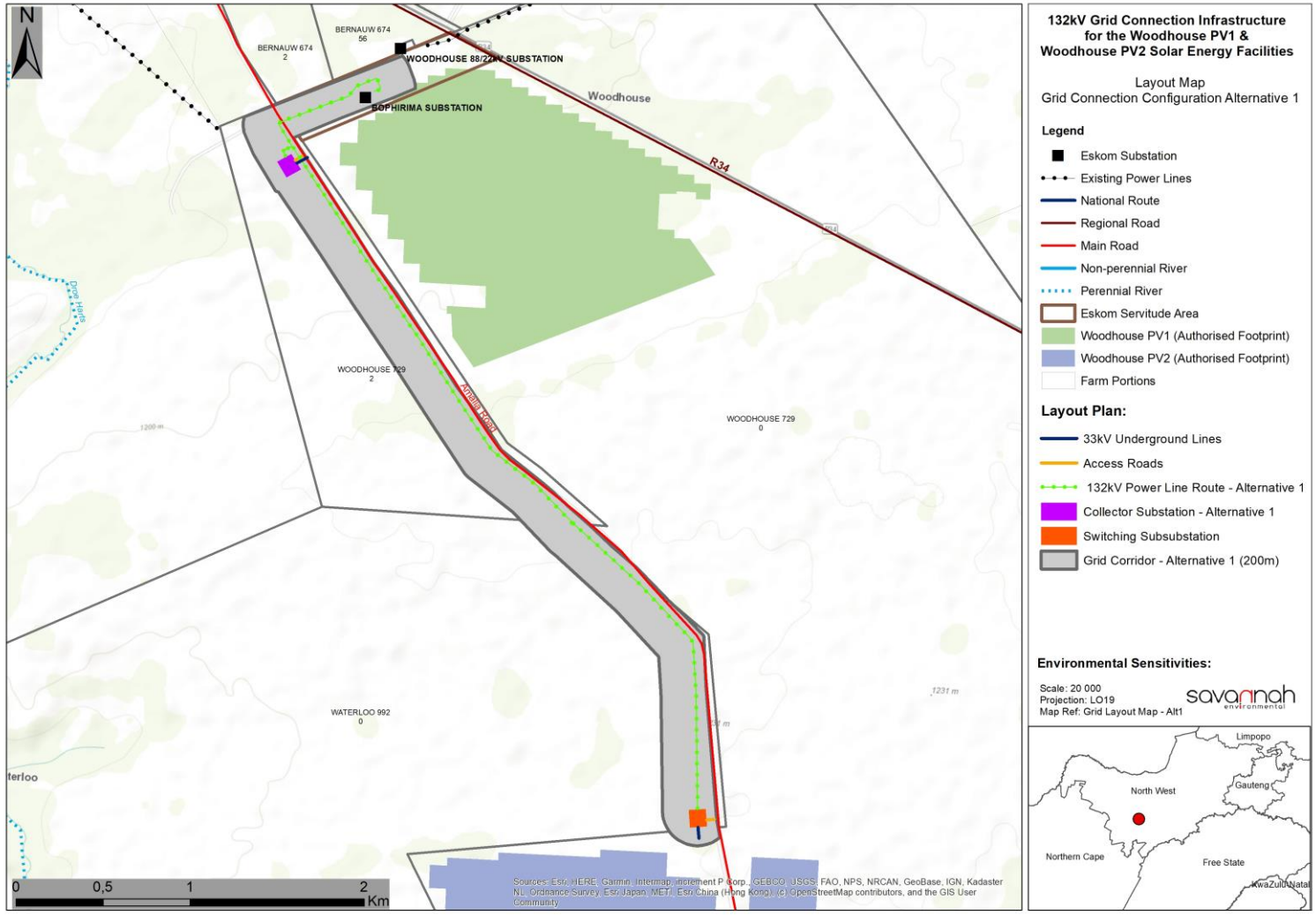

Figure 2.2: Grid connection configuration alternative 1 associated with the Grid Connection for Woodhouse 1 and 2 Solar PV Facilities. The grid connection infrastructure (switching station, collector substations and 132kV power line) will be constructed and operated within the 200m wide corridor.

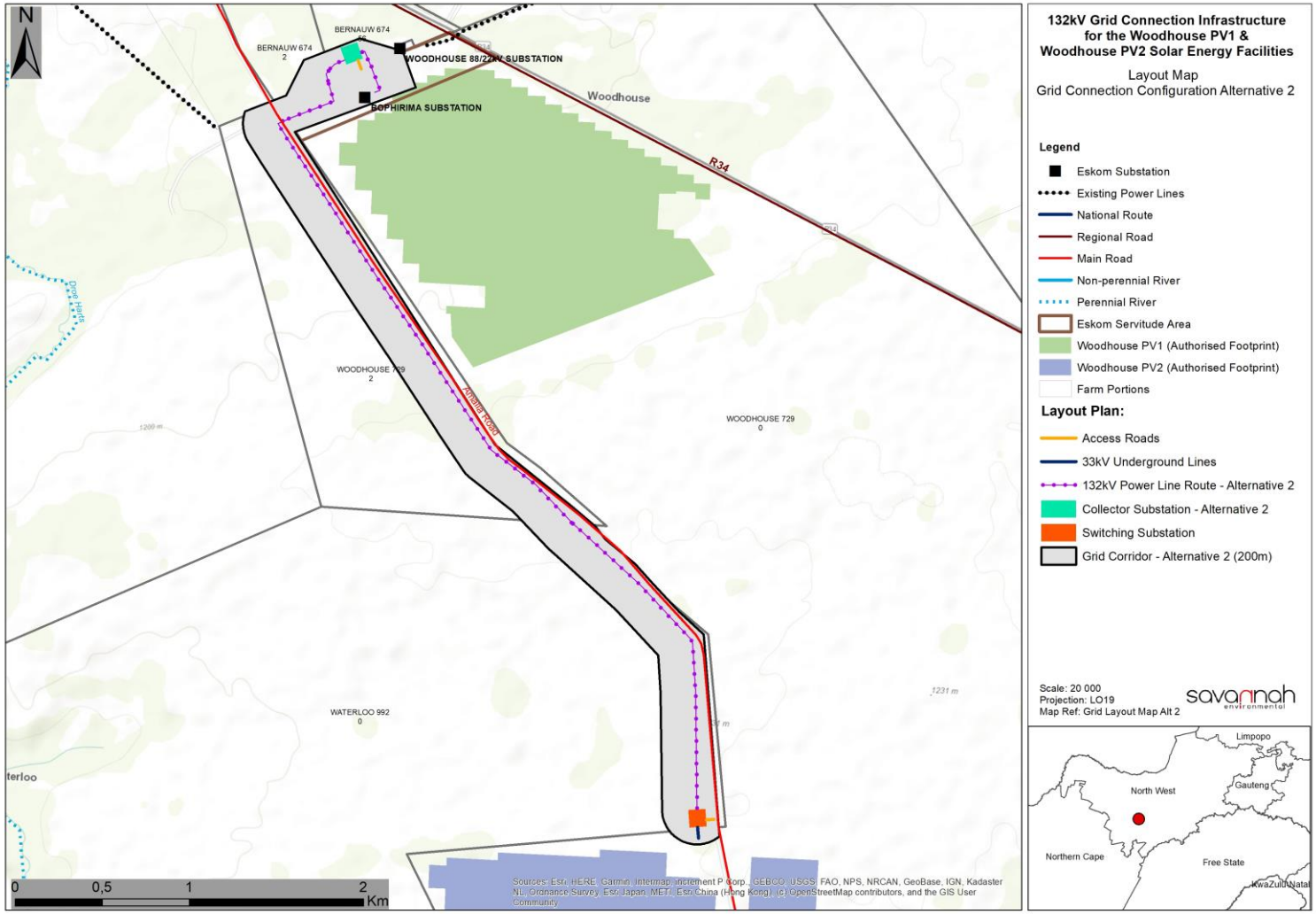

Figure 2.3: Grid connection configuration alternative 2 associated with the Grid Connection for Woodhouse 1 and 2 Solar PV Facilities. The grid connection infrastructure (switching station, collector substation and 132kV power line) will be constructed and operated within the 200m wide corridor.

2.2.4 Project Development Phases associated with the Grid Connection Infrastructure for Woodhouse Solar PVs Grid Connection

Table 2.2: Details of the grid connection infrastructure development phases (i.e. construction, operation and decommissioning)

Construction Phase	
Requirements	» Duration of the construction phase is expected to be up to 12 months. » Create direct construction employment opportunities. Up to 50 direct employment opportunities will be created during the construction phase. » No on-site labour camps. Employees to be accommodated in the nearby towns such as Vryburg, Huhundi, Delareyville, Stella, and Schweizer- Reneke and transported to and from site on a daily basis. » Overnight on-site worker presence would be limited to security staff. » Construction waste will be stored on site and waste removal and sanitation will be undertaken by a sub-contractor and will comply with the municipality waste disposal laws. » Where water is required for the construction phase and potable needs, water will be sourced from private service providers.
Construction sequence	Overhead power lines are constructed in the following simplified sequence: » Step 1: Surveying of the development area and negotiating with affected landowners; » Step 2: Final design and micro-siting of the infrastructure based on geo-technical, topographical conditions and potential environmental sensitivities; » Step 3: Vegetation clearance and construction of access roads/tracks (where required); » Step 4: Construction of tower foundations; » Step 5: Assembly and erection of infrastructure on site; » Step 6: Stringing of conductors; » Step 7: Rehabilitation of disturbed areas; » Step 8: Continued maintenance. It is anticipated that the construction of the 132kV power line and associated infrastructure will take up to 12 months to complete. The final definition of the centre line for the power line and co-ordinates of each bend in the line (if applicable) will be determined on receipt of an environmental authorisation of the assessed corridor by the competent authority and after negotiations with landowners and final environmental and technical surveys. Switching substation and Collector substation are constructed in the following simplified sequence: » Step 1: Conduct geotechnical investigations to determine founding conditions; » Step 2: Conduct site survey; » Step 3: Vegetation clearance and construction of access road; » Step 4: Site grading and levelling; » Step 5: Construction of foundations;

	» Step 6: Import and delivery to site of collector substation components; » Step 7: Construction of collector substation; » Step 8: Rehabilitation of disturbed area and protection of erosion sensitive areas; and » Step 9: Testing and commissioning. The footprint of the substations may include administrative buildings required for the operation and management of the substation.
Activities to be undertaken	
Conduct surveys prior to construction	» Including, but not limited to: a geotechnical survey, site survey (including the location of the substations within the grid connection corridor) and confirmation of the power line servitude, and all other associated infrastructure.
Establishment of access roads	» Access roads/tracks to be established within the grid connection corridor (underneath the final confirmed power line route) for construction and/or maintenance activities required. » Access roads/tracks will be established as construction commences at the various locations within the corridor. » Existing access roads will be utilised where possible to minimise impact, and upgraded where required. » Access roads/ tracks will be limited to gravel roads or jeep tracks.
Undertake site preparation	» Including the clearance of vegetation within defined substation footprints and cutline as needed along the final power line route, the establishment of access roads/tracks and excavations for foundations. » Stripping of topsoil to be stockpiled, backfilled, removed from site and/or spread on site. » To be undertaken in a systematic manner to reduce the risk of exposed ground being subjected to erosion. » Include search and rescue of floral species of concern (where required) and the identification and excavation of any sites of cultural/heritage value (where required) along the final power line route and within the substation footprints.
Establishment of laydown areas and batching plant on site	» A laydown area for the storage of grid infrastructure components, including the civil engineering construction equipment. » The laydown area will also accommodate building materials and equipment associated with the construction of buildings. » No borrow pits will be required. Infilling or depositing materials will be sourced from licenced borrow pits within the surrounding areas. » A temporary concrete batching plant of 50m x 50m in extent to facilitate the concrete requirements for grid line and substation foundations and bund areas. Other options include the use of mobile batching plants that allow for *in situ* batching of concrete.
Undertake site rehabilitation	» Commence with rehabilitation efforts once construction is completed in an area, and all construction equipment is removed. On commissioning, access points to the site that will not be required for the operation phase will be closed and prepared for rehabilitation.
<u>Operation Phase</u>	
Requirements	» Duration will be more than 20 years, or longer as needed for the operation of Woodhouse Solar Development. » Requirements for security and maintenance of the grid connection infrastructure.

	» Employment opportunities relating mainly to operation activities and maintenance. Very limited employment opportunities will be available[6]. » Current land-use activities, i.e. grazing, can continue in the areas adjacent to the infrastructure.
Activities to be undertaken	
Operation and Maintenance	» Part-time security and maintenance staff, especially for the substations. » Disposal of waste products (e.g. oil) in accordance with relevant waste management legislation. » On-going rehabilitation of those areas which were disturbed during the construction phase. » During this operation phase vegetation within the power line servitude, and around the substations will require management only if it impacts on the safety and operational objectives of the project. » The maintenance of the grid connection infrastructure will be the responsibility of the holder of the Environmental Authorisation.
<u>Decommissioning Phase</u>	
Requirements	» Decommissioning of the Grid Connection for Woodhouse 1 and 2 Solar Facilities at the end of its economic life. » Expected lifespan of approximately 20 years (with maintenance) before decommissioning is required. » Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	
Site preparation	» Confirming the integrity of access to the grid connection infrastructure to accommodate the required equipment. » Mobilisation of decommissioning equipment.
Disassemble components and rehabilitation	» The grid connection infrastructure components will be disassembled and reused and recycled (where possible). » Where components cannot be reused or recycled it will be disposed of in accordance with the regulatory requirements at the time of decommissioning. » Disturbed areas, where infrastructure has been removed, will be rehabilitated, if required and depending on the future land-use of the affected areas and the relevant legislation applicable at the time of decommissioning.

It is expected that the areas affected by the grid connection infrastructure will revert back to its original land-use (i.e. primarily sheep farming and grazing) once the Woodhouse Solar Development (and by implication the associated grid connection infrastructure) has reached the end of its economic life and all infrastructure has been decommissioned.

[6] It must be noted that the Genesis Eco-Energy Developments (Pty) Ltd will construct the 132kV power line, however ownership of the line will be transferred to Eskom following the completion of the construction. The operation and maintenance of the line will then be undertaken by Eskom.

CHAPTER 3 REGULATORY AND PLANNING CONTEXT

This chapter provides insight into the policy and legislative context within which the development of the proposed Woodhouse Solar PVs Grid Connection will be undertaken. It identifies environmental legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process which may be applicable to or have bearing on the proposed project.

3.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA report includes the following information required in terms of the EIA Regulations, 2014 - Appendix 1: Content of Basic Assessment reports:

Requirement	Relevant Section
3(e)(i) a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report	Chapter 4 as a whole provides an overview of the policy and legislative context which is considered to be associated and relevant to the development of the Woodhouse Solar PVs Grid Connection. The regulatory and planning context has been considered at international, national, provincial and local level.
3(e)(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools, frameworks and instruments.	**Tables 3.1, 3.2, 3.3** and **3.4** illustrate the compliance of the proposed solar grid connection solution with the legislation, policies, plans, guidelines, tools, frameworks and instruments.

3.2. Strategic Electricity Planning in South Africa

The regulatory hierarchy of policy and planning documentation that support the development of a project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels. These policies are discussed in more detail in the following sections, along with the provincial and local policies or plans that have relevance to the proposed development of Woodhouse Solar PVs Grid Connection.

At **National Level**, the main regulatory agencies are:

- ***Department of Forestry, Fisheries and the Environment (DFFE):*** previously known as the Department of Environmental Affairs (DEA), is responsible for environmental policy and is the controlling authority in terms of NEMA and the 2014 EIA Regulations (GNR 326). As per GNR 779 of 01 July 2016, DFFE is the Competent Authority, and is charged with making a decision regarding the granting of the relevant EA for this project based on its association with the Woodhouse Solar PV1 and PV2 developments.
- ***South African Heritage Resources Agency (SAHRA):*** SAHRA is a statutory organisation established under the National Heritage Resources Act (No. 25 of 1999) (NHRA), as the national administrative body responsible for the protection of South Africa's cultural heritage.
- ***Department of Human Settlement Water and Sanitation (DHSWS):*** is responsible for effective and efficient water resources management to ensure sustainable economic and social development. DHSWS is also

responsible for evaluating and issuing licenses pertaining to water use (i.e. Water Use Licenses (WULs) and / or registration of General Authorisations (GAs)).

- ***Department of Mineral Resources and Energy*:** is responsible for minerals and all energy forms and is responsible for forming and approving the IRP (Integrated Resource Plan for Electricity). In addition, approval from the Department may be required to use the land surface contrary to the objects of the Act in terms of Section 53 of the MPRDA (Act No. 28 of 2002). The Act provides that approval is required from the Minister to ensure that proposed activities do not sterilise mineral resources that might occur on site.
- ***The Department of Rural Development and Land Reform:*** DRDLR is dedicated to the social and economic development of rural South Africa and is responsible for providing a framework for rural development.
- ***South African National Roads Agency Limited (SANRAL):*** SANRAL is responsible for the regulation and maintenance of all national roads and routes.
- ***National Energy Regulator of South Africa (NERSA):*** This body is responsible for regulating all aspects of the electricity sector and will ultimately issue licenses for IPP projects to generate electricity.

At **Provincial Level**, the main regulatory agencies are:

- ***North West Department of Rural, Environment and Agricultural Development (READ):*** READ is the Commenting Authority for the project and is also responsible for issuing any biodiversity and conservation-related permits. READ's involvement relates specifically to sustainable resource management, conservation of protected species and land care.
- ***North West Department of Public Works and Roads (NWDPWR)*:** NWDPWR is responsible for roads and the granting of exemption permits for the conveyance of abnormal loads on public roads.
- ***North West Provincial Heritage Resources Agency (NWPHRA):*** NWPHRA, the North West Provincial Heritage Resources Authority is responsible for the identification, conservation and management of heritage resources, as well as commenting on heritage related issues within the province.
- ***North West Department of Community Safety and Transport Management (NWDCSTM):*** NWDCSTM This Department provides effective co-ordination of crime prevention initiatives, provincial police oversight, traffic management and road safety towards a more secure environment.

At the **Local Level** the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the North West, both the local and district municipalities play a role. The local municipality includes the Naledi Local Municipality which forms part of the Dr Ruth Segomotsi Mompati District Municipality. In terms of the Municipal Systems Act (Act No 32 of 2000) it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their governance.

The relevant legislation and policies listed and discussed below are relevant to the Woodhouse Solar PVs Grid Connection project and the Woodhouse Solar PV1 and PV2 developments which comprises of two individual solar PV facilities (assessed as part of separate Basic Assessment Processes).

3.3. Policy and Planning Considerations on International, National, Provincial and Local Levels

3.3.1. Policy and Planning on an International Level

South Africa has committed to various international policies which relate to environmental concerns, specifically that of climate change and global warming. **Table 3.1** below provides a summary of the

international policies and plans that South Africa has made commitments towards, and how the proposed development of the Woodhouse Solar PVs Grid Connection aligns with the thinking or commitments of these agreements.

Table 3.1: International policies and plans relevant to the Woodhouse Solar PVs Grid Connection

Policy or Plan	Is the development of the Woodhouse Solar PVs Grid Connection aligned with this policy or plan?
The Kyoto Protocol, 1997	Yes. The protocol calls for the reduction of South Africa's greenhouse gas emissions through actively cutting down on using fossil fuels, or by utilising more renewable resources. The development of Woodhouse Solar PVs Grid Connection will enable the evacuation of additional capacity to the renewable energy sector of the country and strengthen the commitment and action plan to achieve the requirements as set out in the protocol.
United Nations Framework Convention on Climate Change and COP21 – Paris Agreement	Yes. South Africa supports the adoption of the Paris Agreement which has the main objective of addressing the climate change issue and marks the first international political response to climate change. South Africa has set out a goal of 17GW of renewable energy by 2030 within the IRP of 2019. Through the development of renewable energy projects (including Woodhouse Solar PV1 and PV2) additional renewable energy will be made available to the country, which in turn will demonstrate the contribution that South Africa is making to the global response to climate change specifically relating to the development of the renewable energy sector. The development of the proposed solar PVs grid connection is required in order to enable the evacuation of the solar power from the Woodhouse Solar PV plants to the national grid.
The Equator Principles III, June 2013	Yes. The Equator Principles (EPs) III constitute a financial industry benchmark used for determining, assessing, and managing a project's environmental and social risks. The EPs are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The EPs are applicable to large infrastructure projects and apply globally to all industry sectors. In terms of the EPs, South Africa is a non-designated country, and as such the assessment process for projects located in South Africa evaluates compliance with the applicable IFC Performance Standards on Environmental and Social Sustainability and Environmental Health and Safety (EHS) Guidelines. The Woodhouse Solar Grid Connection is currently being assessed in accordance with the requirements of the 2014 EIA Regulations, as amended (GNR 326), published in terms of Section 24(5) of the National Environmental Management Act (No. 107 of 1998) (NEMA), which is South Africa's national legislation providing for the authorisation of certain controlled activities. Through this assessment, all potential social and environmental risks are identified and assessed, and appropriate mitigation measures proposed.
International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability, January 2012	Yes. The overall objectives of the IFC performance standards are to fight poverty, do no harm to people or the environment, fight climate change by promoting low carbon development, respect human rights, promote gender equality, provide information prior to project development, collaborate with the project developer in order to achieve the performance standard, provide advisory services and notify countries of trans boundary impacts. When considering the development of the grid connection infrastructure associated with the development of the Woodhouse Solar Development the following performance standards are anticipated to be applicable at this stage of the BA process: » *Performance Standard 1:* Assessment and Management of Environmental and Social Risks and Impacts

Policy or Plan	Is the development of the Woodhouse Solar PVs Grid Connection aligned with this policy or plan?
	» *Performance Standard 2:* Labour and Working Conditions » *Performance Standard 3:* Resource Efficiency and Pollution Prevention » *Performance Standard 4:* Community Health, Safety and Security » *Performance Standard 6:* Biodiversity Conservation and Sustainable Management of Living Natural Resources » *Performance Standard 8:* Cultural Heritage

3.3.2. Policy and Planning on a National Level

National policies and plans adopted by South Africa, which are considered to be relevant to the development of Woodhouse Solar PVs Grid Connection have been summarised in **Table 3.2**.

Table 3.2: National policies, plans and legislation relevant to the grid connection infrastructure for the Woodhouse Solar PV1 and PV2 Developments

Policy, Plan or Legislation	Is the development of the Woodhouse Solar PVs Grid Connection aligned with this policy, plan or legislation?
Constitution of the Republic of South Africa, 1996	Yes. Section 24 of the Constitution pertains specifically to the environment. It states that Everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The Constitution outlines the need to promote social and economic development. Section 24 of the Constitution therefore requires that development be conducted in such a manner that it does not infringe on an individual's environmental rights, health, or well-being. This is especially significant for previously disadvantaged individuals who are most at risk to environmental impacts.
National Environmental Management Act (No. 107 of 1998) (NEMA)	Yes. South Africa's environmental legislation sets the framework for environmental management in South Africa. NEMA is founded on the principle that everyone has the right to an environment that is not harmful to their health or well-being as contained within the Bill of Rights. The national environmental management principles states that the social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed, evaluated, and decisions must be appropriate in the light of such consideration and assessment. The need for responsible and informed decision-making by government on the acceptability of environmental impacts is therefore enshrined within NEMA
The National Energy Act (2008)	Yes. One of the objectives of the Act is to promote the diversity of the supply of energy and its sources. In this regard, the preamble makes direct reference to renewable resources and states that provision must be made for increased generation and consumption of renewable energies. The development of the Woodhouse Solar PV Grid Connection enables the evacuation of renewable power into the national grid and thereby promotes diversity of supply of energy and the source of supply, in line with the Act's objectives.
White Paper on the Energy Policy of South Africa, 1998	Yes. The South African Energy Policy of 1998 identifies five key objectives, namely increasing access to affordable energy services, improving energy sector governance, stimulating economic development, managing energy related environmental impacts and securing

Policy, Plan or Legislation	Is the development of the Woodhouse Solar PVs Grid Connection aligned with this policy, plan or legislation?
	supply through diversity. In order to meet these objectives South Africa needs to optimally use available energy resources. The development of the Woodhouse Solar PV Grid Connection will enable the contribution, albeit only to a limited extent, to the achievement of the five objectives of the Energy Policy of the country.
White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)	Yes. This White Paper fosters the uptake of renewable energy in the economy and has a number of objectives that need to be met, including that equitable resources are invested in renewable technologies. South Africa is also endowed with renewable energy resources that can be sustainable alternatives to fossil fuels. The development of additional renewable energy projects (including Woodhouse Solar PV1 and PV2) will promote the use of the abundant South African renewable energy resources and contribute to long-term energy security and diversification of the energy mix. The development of the grid connection infrastructure enables the evacuation of the generated power into the national grid and thereby enables the use of renewable energy technologies for the country.
The Electricity Regulation Act, 2006 (Act No. 4 of 2006), as amended	Yes. The Act establishes a national regulatory framework for the electricity supply industry of the country and introduces the National Energy Regulator of South Africa (NERSA) as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated. The developer of the Woodhouse Solar PV1 and PV2 projects will have to ensure compliance with this Act for the distribution of the generated power into the national grid.
Renewable Energy Policy in South Africa	Yes. Support for the Renewable Energy Policy is guided by a rationale that South Africa has a very attractive range of renewable energy resources, particularly solar and wind, and that renewable applications are, in fact, the least cost energy service in many cases from a fuel resource perspective (i.e. the cost of fuel in generating electricity from such technology); more so when social and environmental costs are taken into account. However, the National Energy Policy acknowledges that the development and implementation of renewable energy applications has been largely neglected in South Africa. Challenges regarding the implementation of renewable energy have been identified. Through the development of renewable energy projects (including the Woodhouse PV 1 and Woodhouse PV 2 Solar developments and the Woodhouse Solar PVs Grid Connection), additional renewable energy will be made available which will assist with the further growth and development of the renewable energy sector. The development of the grid connection infrastructure enables the evacuation of the generated power into the national grid and thereby enables further growth and development of the renewable energy sector.
National Development Plan (NDP)	Yes. The NDP aims at eliminating poverty and reducing inequality by 2030 and identifies 9 key challenges and associated remedial plans. Managing the transition towards a low carbon national economy is identified as one of the 9 key national challenges. Expansion and acceleration of commercial renewable energy is identified as a key intervention strategy. The plan also sets out steps that aim to ensure that, in 20 years, South Africa's energy system looks very different to the current situation: coal will contribute proportionately less to the primary-energy needs, while gas and renewable energy resources – especially wind, solar and imported hydroelectricity – will play a much larger role. Through the development of renewable energy projects (including the Woodhouse PV 1 and Woodhouse PV 2 Solar developments and the associated Woodhouse Solar PVs Grid Connection) additional renewable energy will be available which will assist in expanding the renewable energy sector of the country and add to the diversification of the energy mix, which is moving away from coal and towards the use of gas and renewable energy.

Policy, Plan or Legislation	Is the development of the Woodhouse Solar PVs Grid Connection aligned with this policy, plan or legislation?
Integrated Energy Plan (IEP)	Yes. The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output of analyses founded on a solid fact base. Eight key objectives were identified which relate mainly to the security, cost, access, diversity, efficiency, impact in terms of emissions, conservation and social benefits in terms of energy planning. The IEP recognises the potential of renewable energy for power generation. With the additional renewable energy to be generated by the Woodhouse Solar PV1 and PV2 and to be evacuated to the national grid via the proposed grid connection infrastructure, a contribution to this objective will be made. Also, with the development of Woodhouse Solar Development and the proposed grid connection infrastructure, the eight key objectives in terms of energy planning will be met, even if only to a limited extent.
Integrated Resource Plan (IRP) 2010 - 2030	Yes. The Integrated Resource Plan (IRP) for Electricity 2010 – 2030 constitutes a subset of the IEP and is South Africa's national electricity plan. The document outlines the proposed generation new-build fleet for South Africa. The adopted scenario was derived based on a cost-optimal solution for new-build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation. The IRP essentially drives the assortment of energy to be implemented for South Africa which is known as the energy mix of the country, considering various generation technologies. The plan includes 17.8GW of renewables, 9.6GW of nuclear; 6.25GW of coal, and approximately 8.9GW of other generation sources such as hydro, and gas. The development of the proposed grid connection infrastructure enables the evacuation of the generated power from the Woodhouse Solar PV1 and PV2 into the national grid and thereby contributes to the energy mix of the country as set out in the IRP.
Strategic Integrated Projects (SIP)	Yes. In 2010, a National Development Plan was drafted to address socio-economic issues affecting development in South Africa. These issues were identified and placed under 18 different Strategic Integrated Projects (SIPs) to address the spatial imbalances of the past by addressing the needs of the poorer provinces and enabling socio-economic development. The development of the Woodhouse Solar PVs Grid Connection solution will support the Strategic Integrated Projects within one SIP, which relates to the development of the associated infrastructure. This is known as SIP 10 – electricity transmission and distribution for all. In support of SIP 10, the Department of Environmental Affairs undertook a Strategic Environmental Assessment (SEA) which aims to provide guidance for the efficient and sustainable expansion of strategic electricity grid infrastructure in South Africa. This SEA identified the optimal location for strategic corridors where transmission infrastructure expansion is needed to enable the balancing of future demand and supply requirements, while minimising negative impacts to the environment. These areas are referred to as Power Corridors, and were gazetted within GNR113 of February 2018. The grid connection corridor proposed for the development of the grid connection infrastructure is located within the Northern Transmission Corridor and is therefore considered to be in line with national planning in this regard.
New Growth Path (NGP) Framework, 2010	Yes. The purpose of the New Growth Path (NGP) Framework is to provide effective strategies towards accelerated job-creation through the development of an equitable economy and sustained growth. The target of the NGP is to create 5 million jobs through the green economy. With economic growth and employment creation as the key indicators identified in the NGP. To achieve this, government will seek to, amongst other things, identify key areas for large-scale employment creation, as a result of changes in conditions in South Africa and globally, and to develop a policy package to facilitate

Policy, Plan or Legislation	Is the development of the Woodhouse Solar PVs Grid Connection aligned with this policy, plan or legislation?
	employment creation in these areas. The Woodhouse Solar PVs Grid Connection solution will assist with the creation of both temporary and permanent employment opportunities during the construction and operation phases, which will contribute, albeit to a limited extent, to the economy and sustainable growth.
National Climate Change Response Strategy	Yes. This strategy aims to address issues identified as priorities for dealing with climate change in the country. The focus of the strategy is adapting to climate change; developing a sustainable energy programme; adopting an integrated response by the relevant government departments; compiling inventories of greenhouse gases; accessing and managing financial resources; and research, education, and training. The development of the Woodhouse Solar PVs Grid Connection (through the Woodhouse Solar PV1 and PV2) will enable additional uptake of renewable energy into the national grid which will reduce the need for the use of coal as an energy resource and thereby assist in addressing climate change and global warming.
Climate Change Bill, 2018	Yes, with limited relevance. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. The bill aims to provide for the coordinated and integrated response to climate change and its impacts, provide effective management of inevitable climate change impacts and to make a fair contribution to the global effort to stabilise greenhouse gas concentrations. The Woodhouse Solar Grid Connection relates only to the evacuation of renewable energy into the national grid and would therefore not result in the generation or release of emissions during its operation.

3.3.3. Policy and Planning at a Provincial Level

Policies and plans have been adopted by the North West Province for the management of the area and are considered to be relevant to the development of the Woodhouse Solar PVs Grid Connection solution. **Table 3.3** provides a summary of the relevant provincial plans and policies.

Table 3.3: Provincial policies and plans relevant to the Woodhouse Solar Grid Connection

Policy or Plan	Is the development of the Woodhouse Solar PVs Grid Connection aligned with this policy or plan?
North West Provincial Development Plan (PDP), 2013 (updated 2017/2022)	Yes. The North West Provincial Development Plan (PDP) 2013 (updated 2017/2022) states that the overarching objective, is to overcome certain obstacles relating to the current infrastructure by introducing renewable energy together with energy conservation and efficiency strategies. Furthermore, this will craft a better tomorrow and ensure that underdevelopment, poverty, and inequality is fully addressed in the North West Province. The overall energy objective for the province also includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the diversity of domestic energy supply and avoiding energy imports, while also minimising the detrimental environmental impacts. The implementation of sustainable renewable energy is also to be promoted within the province through appropriate financial and fiscal instruments. With the developed and proposed independent power producer capacity (including the Woodhouse Solar PV 1 and Woodhouse Solar PV2 Development and the associated proposed Woodhouse Solar PVs Grid Connection), the province will produce its own electrical power needs from renewable energy resources (although this energy will be fed into the national grid).

Policy or Plan	Is the development of the Woodhouse Solar PVs Grid Connection aligned with this policy or plan?
North West Province Spatial Development Framework (SDF) – North West Environmental Management Series 7 (2008)	The North West Provincial Government (NWPG) has recently adopted a ten-year growth and development strategy for the province known as North West 2013. In order to fight poverty, unemployment and low levels of skills and expertise, this strategy has two goals. The *Economic Goal* which requires an average economic growth rate of 6.6% per annum and the *Poverty Eradication Goal* to wipe out the basic needs backlog which annually will require investment estimated at R854 million. The key pillars for growth and economic development are: » Agriculture and rural development » Mining and energy » Manufacturing » Trade and finance » Tourism » Construction and infrastructure » Small Medium and Micro Enterprise » Training and skills development The strategy lists a number of transversal objectives of which one is "Ensuring sustainable development through resource and environmental management". The Provincial Spatial Development Framework and Environmental Management Plan (PSDF–EMP) is one of the fundamental implementation instruments of North West 2014 and provides the spatial dimension for this strategy. The key emphasis is on economic growth and poverty eradication. This version mainly provides statements of objectives, key development issues, development concepts/ principles, and the spatial development rationale. The Spatial Development Framework (SDF) addresses the need for spatial planning, socio-economic development, infrastructure and conservation of natural resources. Key socio-economic issues which would require strategic planning provision include: employment (including youth and women); poverty eradication; attracting investment; economic growth; HIV / AIDS and other diseases; food security; physical infrastructure (including availability of industrial land); illiteracy; tourism development; population growth, urbanization and migration. Natural resource issues include inadequate water resources for future development; bush encroachment and alien invasive species; land and soil degradation; and overgrazing. With regard to spatial planning, the legacies of Apartheid-era policy is identified as a key issue and residents of the North West are consequently extremely underdeveloped. The development of the proposed PV facilities and its associated grid connection infrastructure will contribute to economic growth and development, which will in turn help eradicate poverty through job creation and skills development in the region which will be in line with the North West SDF.
North West Provincial Growth and Development Strategy (PGDS) 2004-2014	Goals and objectives of the North West Provincial Growth Development Strategy are to fight poverty and unemployment, improve the low level of expertise and skills which are classified as both immediate and long-term goals and require primary goals for sustained growth and economic development. The proposed facility will contribute to employment creation and skills development which is in line with the goals and objectives of the North West PGDS. The North West Provincial Growth Development Strategy aims at building a sustainable economy to eradicate poverty and improve social development. The proposed Grid

Policy or Plan	Is the development of the Woodhouse Solar PVs Grid Connection aligned with this policy or plan?
	infrastructure will contribute to growth and development of the local area by expanding the economic base and creating employment opportunities.

3.3.3. Policy and Planning on a District and Local Level

Strategic policies at the district and local level have similar objectives for the respective areas, namely the delivery of basic services, including the provision of electricity. The development of the proposed grid connection infrastructure is considered to align with the aims of these policies.

Table 3.4 below provides a summary of the district and local level policies and plans considered to be relevant to the development of the Woodhouse Solar PVs Grid Connection.

Table 3.4: District and local policies and plans relevant to the Woodhouse Solar PVs Grid Connection

Policy or Plan	Is the development of the Woodhouse Solar PVs Grid Connection aligned with this policy or plan?
Dr Ruth Segomotsi Mompati District Municipality Integrated Development Plan (IDP) (2017/2022)- 4th Generation	The mission of the district is, "to ensure optimal utilization of available resources through effective, efficient, sustainable integrated planning and corporate governance." The existing level of development and challenges in Dr Ruth Segomotsi Mompati District Municipality can be summarised as follows: » Dr Ruth Segomotsi Mompati District Municipality is endowed with minerals but this sector remains a small contributor to GDP of the Province; » Population is largely African with low education, low incomes, high unemployment and with minimal access to water and sanitation; » The large African population is largely young with a small percentage of adults who are economically active; » Functional literacy does not favour Africans. There is a great challenge in the provision of education to empower Africans; » Heavy dependency on public administration as employer. There is a critical need to develop the private sector in agriculture and mining involvement. The development of the Small Medium Micro Enterprise (SMME) sector both in the formal and informal sectors is critical. » Current access to water and sanitation services is a concern. The above calls for associated action to improve delivery of the needed services for socio and economic development in the Dr Ruth Segomotsi Mompati District Municipality. The Key Performance Areas (KPA) of the district are as follows: » *Service delivery and infrastructure development:* The objective is to eradicate backlogs in order to improve access to services and ensure proper operations and maintenance. » *Public participation and good governance (governance structures):* The objective is to promote a culture of participatory and good governance. » *Institutional development and transformation:* The objective is to improve organizational cohesion and effectiveness. » *Financial viability:* The strategic objective is to improve overall financial management in the municipalities by developing and implementing appropriate financial management policies, procedures and systems.

Policy or Plan	Is the development of the Woodhouse Solar PVs Grid Connection aligned with this policy or plan?
	» *Local economic development:* The strategic objective is to create an environment that promotes the development of the local economy and facilitate job creation. » *Community services & development:* All citizens have a right to an environment that is not detrimental to human health, and it imposes a duty on the State to promulgate legislation and to implement policies aimed at ensuring that this right is upheld. The strategic objective of the North West Department of Rural, Environment and Agricultural Development (READ) is to facilitate and promote local economic development in the district through existing and shared partnerships. The district is an agricultural hub within the province and as a result, special attention is given to promoting agricultural initiatives and ensuring value chain benefits from the sector. While it is acknowledged that agriculture is one of the main sectors contributing effectively to the Province's GDP, the district needs to ensure equitable focus on other sectors of the economy. The following were identified as key strategic intervention areas to be prioritized from 2014 -2017: » Promotion of Local Economic Development (Agriculture, Agri-Business, Land and Rural Development) » Service Delivery (Infrastructure Development and Transportation) Attraction of major investments to the district remains a challenge because of the poor infrastructure conditions, more specifically roads, water networks or reticulation, communication, electricity and transport networks. The critical importance of commitment to transforming the economy of the district therefore remains emphasised. This will ensure that job opportunities are increased for the unemployed masses (mainly the youth) of the Dr Ruth Segomotsi Mompati District Municipality. The IDP aims at promoting local economic growth and social development in order to provide a better life for the communities. The proposed Woodhouse Solar 1 and 2 PV Facilities and its associated grid connection infrastructure will provide employment opportunities and contribute in assisting the district municipality in achieving local economic development and building a sustainable economy through introducing a relatively new sector into the local economy.
Naledi Local Municipality (NLM) Integrated Development Plan (IDP) (2019-2020)	One of the primary objectives of the IDP process for the NLM was to create a new vision for the Naledi Local Municipality's future local economic development based on its unique strengths and its capacity to leverage existing assets to generate revenue. Based on the needs analysed in the IDP processes and the Naledi Spatial Development Framework (SDF, 2013), the following key strategic interventions are proposed by the Naledi Local Municipality: » *Strategic Intervention A:* Regional development hub » *Strategic Intervention B:* CBD Revitalisation » *Strategic Intervention C:* Development of the cattle industry » *Strategic Intervention D:* Growth of the game farming, hunting and eco-tourism industries » *Strategic Intervention E:* Maximise revenue opportunities » *Strategic Intervention F:* Uninterrupted basic service delivery

Policy or Plan	Is the development of the Woodhouse Solar PVs Grid Connection aligned with this policy or plan?
	» *Strategic Intervention G:* Attract major renewable energy solar projects The development of the Woodhouse Solar 1 and Woodhouse Solar 2 PV Facilities falls in line with the Strategic Intervention G (attract major renewable energy projects into the area), and the development of Woodhouse Solar PVs Grid Connection Infrastructure is required to connect the Woodhouse Solar 1 and Woodhouse Solar 2 PV Facilities to the national grid. The development will contribute to employment creation and economic growth, which in turn will have a positive multiplier effect on the local area. The IDP 2015/2016 supports the investment of renewable energy developments in the Naledi Local Municipality.

CHAPTER 4. NEED AND DESIREABILITY

One of the requirements of Appendix 1 of the EIA Regulations, 2014, as amended, is to motivate for "*the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location*". The need and desirability of a development needs to consider whether it is the right time and place for locating the type of land-use / activity within the proposed location.

This Chapter provides an overview of the anticipated suitability of the grid connection infrastructure for the Woodhouse Solar PVs Grid Connection to be developed within the proposed grid connection corridor and provides an overview of the need and desirability, and perceived benefits of the project.

4.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of Basic Assessment reports:

Requirement	Relevant Section
3(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location.	The need and desirability of the development of the grid connection infrastructure for the Woodhouse Solar PVs Grid Connection is included and discussed as a whole within this chapter.

4.2. Need and Desirability of the Proposed Project

The construction and operation of the grid connection infrastructure (i.e. Woodhouse Solar PVs Grid Connection) is considered to be essential associated infrastructure for the development of the Woodhouse Solar PV1 and Woodhouse Solar PV2 facilities. The grid connection infrastructure will facilitate the evacuation of the electricity generated by the proposed Woodhouse Solar PV 1 and Woodhouse Solar PV 2, into the national grid via the existing Bophirima substation. The operation of the two solar PV facilities will not be possible without the development of the proposed Woodhouse Solar PVs Grid Connection to provide a connection to the national grid. Therefore, considering the connection between the Woodhouse Solar PVs Grid Connection and the Woodhouse Solar PV facilities the need for the grid connection infrastructure is directly linked to the need and desirability of the two solar PV facilities, which is aligned with national, regional and local policies and plans. This can be summarised as follows:

- The need for the country to respond to the international commitments regarding climate change and reduction in carbon emissions.
- The need at a national level to diversify the power generation technology mix to include up to 17.8GW of renewables, as defined in the Integrated Resource Plan (IRP), 2010 and subsequent updates (as discussed in detail in Chapter 3)
- The need to align development with the requirements of the National Development Plan in order to address the identified socio-economic issues affecting development in South Africa.
- The need for sustainable development at a Provincial level, including the need to utilise its extensive resources for the benefits of the local area.

» The need to align solar development within those Renewable Energy Development Zones (REDZ areas) identified by Government as the most desirable areas for large-scale PV development.

4.3. Receptiveness and Desirability of the identified Grid Connection Corridor to develop the Woodhouse Solar Grid Connection

The feasibility of the identified grid connection corridor for the development of the grid connection infrastructure also provides an indication of the desirability of the development within the area. The section below provides a description of the specific considerations that contribute to the desirability of the identified and assessed corridor.

The identified corridor being assessed for the development of the grid connection infrastructure displays characteristics that contribute to the overall desirability. These include:

Land Availability and Land Use – In order to develop the grid connection infrastructure, sufficient space and access to land from Farm Waterloo 992, Portion 2 of Farm Woodhouse 729, Portion 2 of the Farm Bernauw 674, Remaining Extent of Portion 56 of the Farm Bernauw 674 and Remaining Extent of Farm Woodhouse 729 is required to establish a connection to the Bophirima Substation. The affected properties traversed by the grid connection corridor provides sufficient space for the placement of the switching substation (~1ha), including the respective collector substation components (~1ha) and a 132kV power line (with a servitude width of up to 36m).

The current land use along the grid connection corridor mainly includes livestock grazing activities, as well as energy generation. In addition, the grid connection is also positioned on the western side of an existing main road (Amalia Road) and runs parallel with the roads. As far as could be ascertained, the affected properties have not been considered for an alternative land use such as urban development or crop production. The development of the Woodhouse Solar Grid Connection will therefore not contradict and interfere with the current land use activities, and it is considered that the current and proposed land uses can be undertaken simultaneously without the one impacting on the other. The development of the Woodhouse Solar PVs Grid Connection is therefore considered to be desirable from a land use perspective.

Considering the above, the availability of sufficient space and the current land use activities within the grid connection corridor is considered to be suitable for the development of the grid connection infrastructure.

» ***Access to the National Grid*** – The power line will connect the switching substation (adjacent and North of Woodhouse Solar PV2 facility) to the Woodhouse Collector Substation to which will then feed on to the existing Eskom Bophirima Substation. This grid connection solution will enable the evacuation of the electricity generated by the two PV facilities to the national grid. The solution eliminates the need for the development of two separate power lines in this area. This grid connection solution is also considered to be the shortest feasible connection to the national grid and therefore limits the infrastructure requirements and on-ground disturbance. The Bophirima substation is considered to have adequate capacity in order to evacuate the generated electricity into the national grid.

Considering that access to the national grid is readily available through a connection to the Bophirima Substation, the opportunity to develop consolidated and shared linear infrastructure and the opportunity to minimise the extent of infrastructure required in order to establish a connection to the

national grid, the development of the grid connection infrastructure within the grid connection corridor is identified as desirable.

» ***Geographical and topographical considerations*** – The location of the grid connection infrastructure is considered to be appropriately located as the entire extent of the grid connection corridor is located within the northern corridor of the Strategic Transmission Power Corridors (refer to **Figure 4.1**) which are identified as areas preferred for the development of grid connection infrastructure. The corridor is also located within REDZ (Vryburg Zone 6), which is earmarked for the development of renewable energy developments and its associated infrastructure.

The study area occurs on land that ranges in elevation from approximately 1,141m (in the south) to 1,257m (to the north-west). The region has a relatively even slope, with only two weak ridges to the centre of the study area. The power line will traverse the northern ridge at an elevation of approximately 1,225m above sea level. The terrain morphology is described as plains with no prominent topographical features (hills or mountains) or major (perennial) rivers. The only watercourse is the non-perennial Leeuspruit traversing in a southerly direction from the town of Vryburg, to the south-west of the study area. Besides this river there are very few other drainage lines and a limited amount of farm dams within the study area. The region is relatively arid and is referred to as the Eastern Kalahari Bushveld Bioregion. The average rainfall is indicated at between 300 – 500mm per annum.

The vegetation cover in the region is primarily grassland and low shrubland, with some forest and woodland occurring along the Leeuspruit floodplain. The vegetation type for the entire study area is indicated as Ghaap Plateau Vaalbosveld with the vegetation and landscape features described as "flat plateau with well-developed shrub and open tree layers".

» ***Consideration of sensitive environmental features*** – Through the assessment of a much larger corridor within which the grid connection infrastructure can be placed, an opportunity has been created by the applicant for the avoidance of sensitive environmental features and areas. The consideration of the grid connection corridor enables the avoidance of the environmental sensitivities, thereby ensuring that the grid connection infrastructure can be appropriately placed without resulting in an unacceptable environmental impact. This consideration is in line with the mitigation strategy and enables the achievement of the objectives of the mitigation hierarchy (i.e. avoid, minimise, mitigate). This application of the mitigation strategy will result in the identification of the optimised placement of the grid connection infrastructure within the grid connection corridor.

The development of the Woodhouse Solar PVs Grid Connection within the corridor provides an opportunity through the assessment of a larger grid connection corridor which enables the consideration and avoidance of sensitive environmental features located within the grid connection corridor. This is considered to be desirable for the development.

Considering the receptiveness of the grid connection corridor for the development of the grid connection infrastructure it is identified that there is a definite need and desirability for the construction and operation of the Woodhouse Solar PVs Grid Connection within the proposed grid connection corridor.

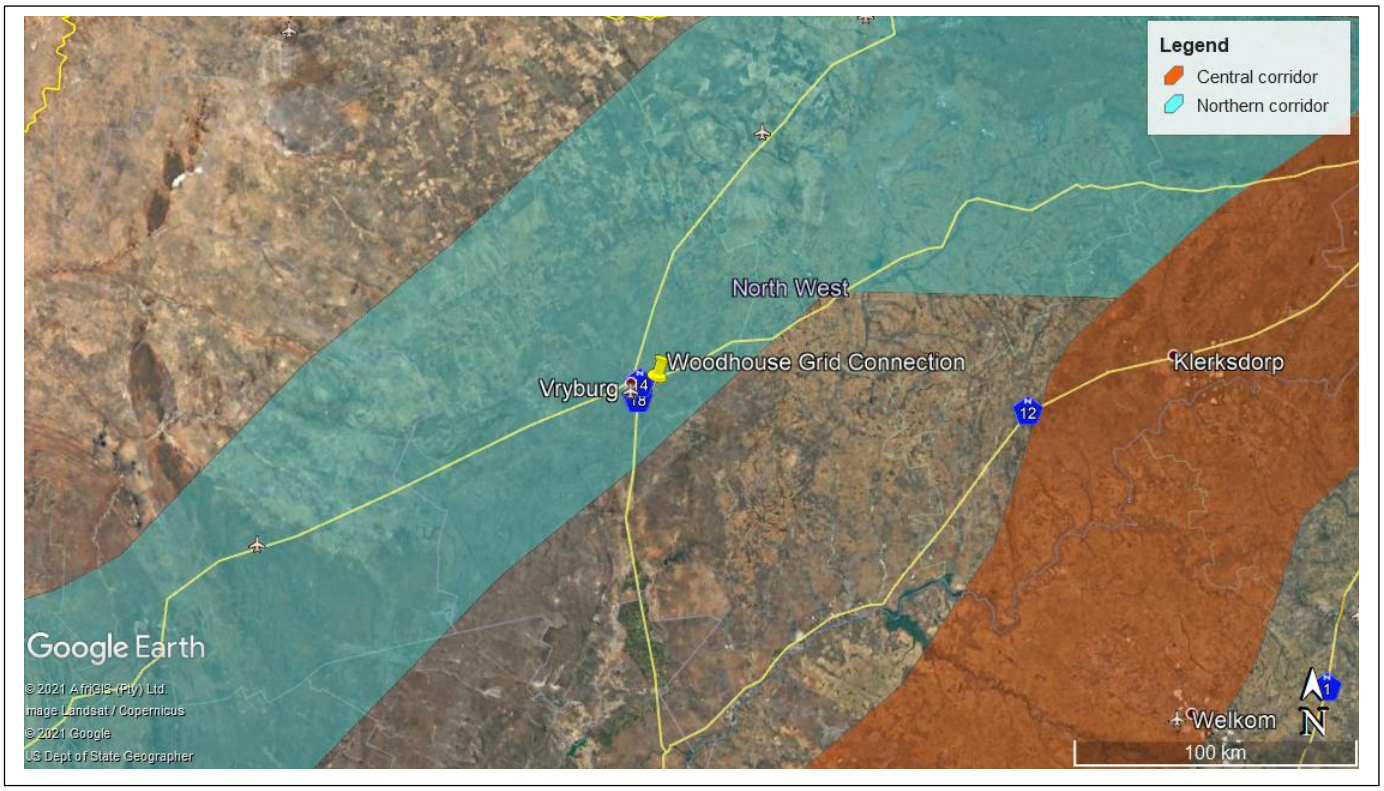

Figure 4.1: Strategic Transmission Corridors identified as the optimal locations where power infrastructure expansion is needed to enable the balancing of future demand and supply requirements, while minimising negative impacts to the environment.

CHAPTER 5. APPROACH TO UNDERTAKING THE BA PROCESS

In terms of the EIA Regulations of December 2014 (amended in April 2017) published in terms of the NEMA (Act No. 107 of 1998) as amended, the Woodhouse Solar PVs Grid Connection triggers listed activities requiring environmental authorisation.

The BA process aims at identifying and describing potential environmental issues associated with the construction of the realigned access road. In order to ensure that a comprehensive assessment is provided to the competent authority and I&APs regarding the impacts of development of the grid connection, detailed independent specialist studies were undertaken as part of the BA process.

During the undertaking of the BA process South Africa was subjected to the spread of COVID-19 throughout the country which led to the declaration and enforcing of Government Gazette 43096 which placed the country in a national state of disaster limiting the movement of people to curb the spread of the virus. Considering the limitations experienced during this time a comprehensive consultation process was designed and implemented to cater for the undertaking of a full-scale, innovative public participation process which included I&APs, the competent authority, directly impacted landowners/occupiers, adjacent landowners/occupiers, relevant Organs of State departments, ward councillors and other key stakeholders. This chapter serves to outline the process that was followed during the BA process.

5.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of the BA Report:

Requirement	Relevant Section
3(d)(i) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for.	All listed activities triggered as a result of the development of the grid connection infrastructure have been included in section 5.2, **Table 5.1**. The specific project activity relating to the relevant triggered listed activity has also been included in **Table 5.1**.
3(h)(ii) details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs.	The details of the public participation process undertaken for the grid connection infrastructure have been included and described in section 5.3.2.
3(h)(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	All comments raised during the 30-day review and comment period of the BA Report and through on-going consultation with I&APs will be included as part of a C&R report (Appendix C) to be submitted as part of the Final BA Report to Department of Forestry, Fisheries and the Environment (DFFE) for decision-making.
3(h)(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration	The methodology used to assess the significance of the impacts of the grid connection infrastructure has been included in section 5.4.

Requirement	Relevant Section
and probability of potential environmental impacts and risks associated with the alternatives.	
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed.	The assumptions and limitations of the BA process being undertaken for the Woodhouse Solar PVs Grid connection is included in section 5.5.

5.2 Relevant legislative permitting requirements

The legislative permitting requirements applicable to the development of the Woodhouse Solar PVs Grid Connection as identified at this stage in the process, are described in more detail under the respective sub-headings:

5.2.1 National Environmental Management Act (No. 107 of 1998) (NEMA)

NEMA is South Africa's key piece of national environmental legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant EA.

The need to comply with the requirements of the EIA Regulations published under NEMA ensures that developers are provided the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project.

The BA process being conducted for the grid connection infrastructure is being undertaken in accordance with Section 24 (5) of NEMA. Section 24 (5) of NEMA pertains to Environmental Authorisations (EAs), and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed Activities are activities identified in terms of Section 24 of NEMA which are likely to have a detrimental effect on the environment, and which may not commence without an EA from the competent authority subject to the completion of an environmental assessment process (either a Basic Assessment (BA) or full Scoping and EIA).

Table 5.1 details the listed activities in terms of the EIA Regulations of December 2014 (as amended) that apply to the development of the grid connection infrastructure, and for which an Application for Environmental Authorisation has been submitted. The table also includes a description of the specific project activities that relate to the applicable listed activities.

Table 5.1: Listed activities as per the EIA regulations that are triggered by the Woodhouse Solar PVs Grid Connection

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per the project description
GN 327, 08 December 2014 (as amended on 07 April 2017)	11(i)	The development of facilities or infrastructure for the transmission and distribution of electricity - (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts. ***A 132kV powerline, 33kV underground power lines, 132kV switching substation, and 132kV collector substation are proposed to connect the Woodhouse Solar 1 and Woodhouse Solar 2 PV facilities to the Eskom electricity grid. The grid connection corridor is located outside an urban area.***
GN 327, 08 December 2014 (as amended on 07 April 2017)	12(ii)(a)(c)	The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more; where such development occurs within (a) a watercourse and (c) within 32 meters of a watercourse, measured from the edge of a watercourse. ***Linear infrastructure with a footprint of 100m² or more will be located within or 32m from a watercourse***
GN R327, 08 December 2014 (as amended on 07 April 2017)	14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic meters or more but not exceeding 500 cubic meters. **The development of the switching substation and collector substation will require the handling of dangerous goods (combustible and flammable liquids, such as oils, lubricants, solvents) where such storage will occur inside containers with a combined capacity exceeding 80 cubic metres but not exceeding 500 cubic metres.**
GN 327, 08 December 2014 (as amended on 07 April 2017)	27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation. ***The development of the switching substation and collector substation will require the clearance of approximately 2ha of indigenous vegetation for construction of the infrastructure.***
GN 324, 08 December 2014 (as amended on 07 April 2017)	4(h)(iv)	The development of a road wider than 4 meters with a reserve less than 13,5 meters (h) in the North West In Critical Biodiversity Areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***The development of access roads wider than 4 metres are required to provide access to the switching substation and collector substation. The proposed access road is located within a Critical Biodiversity Area as identified in the North West Province bioregional plans.***

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per the project description
GN 324, 08 December 2014 (as amended on 07 April 2017)	12(h)(iv)	The clearance of an area of 300 square meters or more of indigenous vegetation (h) in the North West within critical biodiversity areas identified in bioregional plans. ***The clearance of more than 300 square metres will be required for the construction of the grid connection infrastructure. The site is located within a Critical Biodiversity Area as identified in the North West Province bioregional plans.***
GN 324, 08 December 2014 (as amended on 07 April 2017)	14(ii)(a)(c)(h)(iv)	The development of (ii) infrastructure or structures with a physical footprint of 10 square meters or more, where such development occurs (a) within a watercourse or (c) within 32 meters of a watercourse, measured from the edge of a watercourse (h) in the North West (iv) within critical biodiversity areas or ecosystem services areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans. ***Linear infrastructures will be constructed within 32m of a watercourse within an area identified as a Critical Biodiversity Area by the North West Province bioregional plans***

The Woodhouse Solar PV1 and PV2 facilities and its proposed grid connection infrastructure are located within the Vryburg REDZ, as per GN 114 of 2018. This environmental authorisation process related to for proposed grid connection infrastructure is therefore subject to the scope of GN 145 of 2021 for the application for the development of electricity transmission and distribution infrastructure occurring in a REDZ. Furthermore, the timeframe for decision-making on this this application contemplated in terms of sections 3 and 4 of GN 145 of 2021 is 57 days.

5.2.2 National Water Act (No. 36 of 1998) (NWA)

In accordance with the provisions of the National Water Act (No. 36 of 1998) (NWA), all water uses must be licensed with the Competent Authority (i.e. the Regional Department Water and Sanitation). Water use is defined broadly and includes taking and storing water activities that reduce stream flow, waste discharges and disposals, controlled activities (activities that impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.

Table 5.1 lists those Water Uses that may be relevant to the proposed project, and which may require the registration of the water use, or licensing. The table also includes a description of those project activities that relate to the applicable Water Uses.

Table 5.1: List of applicable Water Uses published under Section 21 of NWA, as amended

Notice No.	Activity No.	Description of Water Use
NWA (No. 36 of 1998)	Section 21 (c)	Impeding or diverting the flow of water in a watercourse.

Notice No.	Activity No.	Description of Water Use
	Section 21 (i)	Altering the bed, banks, course or characteristics of a watercourse.

In the event that the flow of water in the river or the ephemeral watercourses is affected, and the bed, banks or course characteristics are altered, application would need to be made for a Water Use License (WUL) in accordance with the requirements of the Regulations Regarding the Procedural Requirements for Water Use License Applications and Appeals (GNR 267), or a General Authorisation (GA) registered in accordance with the requirements of Revision of General Authorisation. The process of applying for a WUL or GA registration will only be completed once a positive EA has been obtained. This is in line with the requirements of the Department of Human Settlements,Water and Sanitation

5.2.3 National Heritage Resources Act (No. 25 of 1999) (NHRA)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

Section 38: Heritage Resources Management

1). Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –

a. the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

b. the construction of a bridge or similar structure exceeding 50m in length;

c. any development or other activity which will change the character of a site –

i). exceeding 5 000m² in extent; or

ii). involving three or more existing erven or subdivisions thereof; or

iii). involving three or more erven or divisions thereof which have been consolidated within the past five years; or

iv). the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of a development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the Woodhouse Solar PVs Grid

Connection, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GNR 668).

5.3 Overview of the Basic Assessment Process for the Woodhouse Solar PVs Grid Connection

Key tasks undertaken for the BA included:

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- Submission of the completed Application for Environmental Authorisation to the competent authority (i.e. DFFE) in terms of Regulations 5 and 6 of the EIA Regulations, 2014 (GNR 326), as amended.
- Undertaking a public participation process in accordance with Chapter 6 of GNR326, and the Department of Environmental Affairs (2017), Public Participation guidelines in terms of the NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa (hereinafter referred to as "the Guidelines") in order to identify issues and concerns associated with the proposed project.
- Undertaking of independent specialist studies in accordance with Appendix 6 of the EIA Regulations, 2014 (GNR326), as amended.
- Preparation of a BA Report in accordance with the requirements of Appendix 1 of GNR325.
- Preparation of EMPrs through the use of the Generic Environmental Management Programmes (EMPrs) for the development and expansion of overhead electricity transmission and distribution infrastructure and substation infrastructure for the transmission and distribution of electricity. This is in line with GNR 435 of March 2019.
- 30-day public and authority review period of the BA Report.
- Compilation of a C&R report detailing the comments raised by I&APs prior to and during the 30-day review period of the BA Report, addressing these comments in detail and finalisation of the BA Report.
- Submission of a final BA Report to the DFFE for review and decision-making.

The tasks are discussed in detail in the sub-sections below.

5.3.1. Authority Consultation and Application for Authorisation in terms of the 2014 EIA Regulations (as amended)

In terms of GN R779 of 01 July 2016, the National Department of Environmental Affairs (DEA), now known as Department of Forestry, Fisheries and Environment (DFFE) has been determined as the Competent Authority for all projects that relate to the Integrated Resource Plan for Electricity (IRP) 2010 – 2030, and any updates thereto. As the Woodhouse Solar PVs Grid Connection solution is necessary associated infrastructure for the Woodhouse Solar PV1 and PV2 developments, the DFFE will be the competent authority. Through the decision-making process, the DFFE will be supported by the North West Department of Rural, Environment and Agricultural Development (READ) as a commenting authority.

Consultation with the regulating authorities (i.e. DFFE and READ), as well as with all other relevant Organs of State, will continue throughout the BA process. To date, this consultation has included the following:

- Submission of the project notification letters and application form for Environmental Authorisation to the DFFE.
- Submission of the BA Report for review and comment by:
  - The competent and commenting authorities.
  - State departments that administer laws relating to a matter affecting the environment relevant to an application for Environmental Authorisation.
  - Organs of State that have jurisdiction in respect of the activity to which the application relates.

A record of all authority correspondence undertaken during the BA process is included in **Appendix B**.

5.3.2. Public Participation Process

Public Participation is an essential and regulatory requirement for an environmental authorisation process and is guided by Regulations 41 to 44 of the EIA Regulations 2014 (GNR 326) (as amended). The purpose of public participation is clearly outlined in Regulation 40 of the EIA Regulations 2014 (GNR 326) (as amended) and is being followed for this project.

The sharing of information forms the basis of the public participation process and offers the opportunity for I&APs to become actively involved in the BA process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner. The public participation process affords I&APs opportunities to provide input into and receive information regarding the BA process in the following ways:

During the BA process:
- provide an opportunity to submit comments regarding the project;
- assist in identifying reasonable and feasible alternatives;
- contribute relevant local information and knowledge to the environmental assessment;
- allow registered I&APs to verify that their comments have been recorded, considered and addressed, where applicable, in the environmental investigations;
- foster trust and co-operation;
- generate a sense of joint responsibility and ownership of the environment; and
- comment on the findings of the environmental assessments.

During the decision-making phase:
- to advise I&APs of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The public participation process therefore aims to ensure that:
- Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs for their review.
- The information presented during the public participation process is presented in such a manner which ensures that the information is carried over to all parties in an understandable manner such that it avoids the possible alienation of the public and prevents them from participating.

- Public participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the project.
- Various ways are provided to I&APs to correspond and submit their comments i.e. fax, post, email.
- An adequate review period is provided for I&APs to comment on the findings of the BA Report.

The Public Participation Process undertaken for the proposed grid connection infrastructure considers the restrictions and limitations imposed by Government through section 27 (2) of the Disaster Management Act (Act No. 57 of 2002) of 2002 and the Directions issued by the Minister of Forestry, Fisheries, and the Environment (DFFE) in terms of consultations with I&APs. A Public Participation Plan was prepared and submitted to the DFFE on 24 March 2021. Approval of the Plan was provided by the DFFE Case Officer via email on 20 April 2021 (**Appendix C**).

Together with the standard public participation approach, additional alternative means of undertaking consultation have been designed and implemented by Savannah Environmental to ensure that I&APs are afforded sufficient opportunity to access project information and raise comments on the project through a web-based platform readily available and accessible to any person registering their interest in the project, and ensures that the public participation process is undertaken in line with Regulations 41 to 44 of the EIA Regulations, 2014 as amended. The Public Participation Plan (**Appendix C**) considers the limitations applied by the Disaster Management Act Regulations prohibiting the gathering of people, limitations which certain I&APs may have in terms of access to computers and internet, as well as access to public spaces currently not open for operation that inhibits access to hard copy documentation. The online stakeholder engagement platform contains the BA report available for review. The use of an online tool enables stakeholders and I&APs to explore the project-specific content in their own time, and still enables them to participate in a meaningful way in the consultation process. Where I&APs do not have access to the online platform, information has been shared via other means such as telephone, email, WhatsApp CD and communication via the Ward Councillor and community representatives.

The schematic illustration overleaf provides an overview of the tools that are available to I&APs and stakeholders to access project information and interact with the public participation team to obtain project information and resolve any queries that may arise, and to meet the requirements for public participation.

i. Stakeholder identification and register of I&APs	•Register as an I&AP on the online platfrom, via completion of a form and provison of contact information, by responding to an advert, or sending a 'please call me' which will be responded to •State interest in the project •Receive all project related information
ii. Advertisments and notifications	•Advertisements, site notices and notifications provide information and details on where to access project information •Notifications regarding the basic assessment process and availability of basic assessment report for public review to be sent via email, post or SMS notifications
iii. Public Involvement and consultation	•Submission of comments or queries via email or post to the PP team •Availability of project information via email, post and/or the online platform
iv. Comment on the Motivation Report	•Availability of the project report via the online platform or other appropriate means for 30-day period. Hard copies to be available only where sanitary conditions can be assured •Submission of comments via the email or post to the PP team •Comments recorded and responded to as part of the process
v. Identification and recording of comments	•Comments and Responses Report, including all comments received to be included in the reporting. •Comments received during full process to be included within the final Report for decision-making.

In terms of the requirement of Chapter 6 of the EIA Regulations of December 2014, as amended, the following key public participation tasks have been undertaken:

» Fix a notice board at a place conspicuous to the public at the boundary or on the fence of—
  (i) the site where the activity to which the application relates is or is to be undertaken; and
  (ii) any alternative site mentioned in the application;
» Give written notice to:
  (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;

(ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
(iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
(iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
(v) the municipality which has jurisdiction in the area;
(vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
(vii) any other party as required by the competent authority.

» Place an advertisement in a local newspaper.
» Open and maintain a register of I&APs and Organs of State.
» Release a BA Report for a 30-day review period.
» Update the C&R Report with all comments raised during the 30-day review period for submission with the final BA Report.

In compliance with the requirements of Chapter 6: Public Participation of the EIA Regulations, 2014 (as amended), the following summarises the key public participation activities conducted to date.

i. Stakeholder identification and Register of Interested and Affected Parties

42. A proponent or applicant must ensure the opening and maintenance of a register of I&APs and submit such a register to the competent authority, which register must contain the names, contact details and addresses of –
(a) All persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;
(b) All persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and
(c) All organs of state which have jurisdiction in respect of the activity to which the application relates.

I&APs have been identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder database, liaison with potentially affected parties in the greater study area and a registration process involving the completion of a reply form. Key stakeholders and affected and adjacent landowners have been identified and registered on the project database. Other stakeholders and/or I&APs are required to formally register their interest in the project. An initial list of key stakeholders identified and registered is listed in **Table 5.2**.

Table 5.2: List of Stakeholders identified for the inclusion in the project database during the public participation process for the Woodhouse Solar PVs Grid Connection.

Organs of State
National Government Departments
Department of Forestry, Fisheries, and the Environment (DFFE)
Department of Mineral Resources and Energy (DMRE)
Department of Agriculture, Land Reform and Rural Development (DALRRD)
Department Human Settlements, Water and Sanitation (DHSWS)
Government Bodies and State-Owned Companies

Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
SENTECH SOC Limited
Provincial Government Departments
North West Department of Rural, Environmental and Agricultural Development (READ)
North West Department of Community Safety and Transport Management
North West Department of Public Works and Roads
North West Provincial Heritage Resources Agency (NWPHRA)
Local Government Departments
Dr Ruth Segomotsi Mompati District Municipality
Naledi Local Municipality
Key Stakeholders and Landowners
Birdlife South Africa
Endangered Wildlife Trust (EWT)
Wildlife and Environment Society of South Africa (WESSA)
Affected landowners, tenants and occupiers
Neighbouring landowners, tenants and occupiers

As per Regulation 42 of the EIA Regulations, 2014 (as amended), all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to **Appendix C** for a listing of the recorded parties). In addition to the above-mentioned EIA Regulations, point 4.1 of the Public Participation Guidelines has also been followed. The register of I&APs contains the names[7], contact details and addresses of:

- all persons who requested to be registered on the database in writing and disclosed their interest in the project;
- all Organs of State which hold jurisdiction in respect of the activity to which the application relates;
- all persons identified and approached through networking or a chain referral system to identify any other stakeholder (i.e. ratepayers associations); and
- all persons who submitted written comments or attended meetings during the public participation process.

I&APs have been encouraged to register their interest in the BA process from the onset of the project, and the identification and registration of I&APs will be on-going for the duration of the BA process. The database of

[7] Contact details and addresses have not been included in the I&AP database as this information is protected by the Protection of Personal Information Act (No 4 of 2013).

I&APs will be updated throughout the BA process, and will act as a record of the I&APs involved in the public participation process.

ii. Advertisements and Notifications

40.(2)(a)	Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of – (i) The site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) Any alternative site.
40.(2)(b)	Giving written notice, in any of the manners provided for in section 47D[8] of the Act, to – (i) The occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (ii) Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area; (iv) The municipality which has jurisdiction in the area; (v) Any organ of state having jurisdiction in respect of any aspect of the activity; and (vi) Any other party as required by the competent authority.
40.(2)(c)	Placing an advertisement in – (i) One local newspaper; or (ii) Any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
40.(2)(d)	Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii); and
40.(2)(e)	Using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to –

[8] Section 47D of NEMA pertains to the delivery of documents, and states that:

(1) A notice or other document in terms of this Act or a specific environmental management Act may be issued to a person –
- *(a) By delivering it by hand;*
- *(b) By sending it by registered mail –*
  - *(i) To that person's business or residential address; or*
  - *(ii In the case of a juristic person, to its registered address or principal place of business;*
- *(bA) By faxing a copy of the notice or other document to the person, if the person has a fax number;*
- *(bB) By e-mailing a copy of the notice or other document to the person, if the person has an e-mail address; or*
- *(bC) By posting a copy of the notice or other document to the person by ordinary mail, if the person has a postal address;*
- *(c) Where an address is unknown despite reasonable enquiry, by publishing it once in the Gazette and once in a local newspaper circulating in the area of that person's last known residential or business address.*

(2) A notice or other document issued in terms of subsection (1)(b), (bA), (bB), (bC) or (c) must be regarded as having come to the notice of the person, unless the contrary is proved."

(i) Illiteracy;
(ii) Disability; or
(iii) Any other disadvantage.

The BA process was announced with an invitation to the Organs of State, potentially affected and neighbouring landowners and general public to register as I&APs and to actively participate in the process. This was achieved via the following:

- Compilation of a letter providing background information, technical and environmental details on this project (in the context of the project), how to become involved in the BA process, announcing the BA process, and notifying Organs of State, potentially affected and neighbouring landowners, as well as registered stakeholders/I&APs of the Woodhouse Solar PVs Grid Connection solution (refer to **Appendix C**). The letter was distributed on 06 September 2021 via email to identified and registered stakeholders and I&APs. The information is also available electronically on the Savannah Environmental website (https://savannahsa.com/public-documents/grid-infrastructure/)
- Placement of site notices regarding the BA process at visible points along the affected properties of the grid connection corridor, in accordance with the requirements of the EIA Regulations, on 22 July 2021 Photographs and the GPS co-ordinates of the site notices are contained in **Appendix C**.
- Placement of advertisement announcing the BA process and the availability of and inviting comment on the BA Report in Stellalander Newspaper on 1 September 2021, prior to the commencement of the 30-day review period. This advert also included the details on the review period for the BA report and the location of where the report can be accessed. The details of the newspaper advert placement is be contained in **Appendix C** of the BA Report.
- The BA Report has been made available for review by I&APs for a 30-day review period from **6 September 2021 to 7 October 2021**. The BA Report is available on the Savannah Environmental website. The evidence of distribution of the BA Report will be included in the final BA Report, which will be submitted to the DFFE.

iii. Public Involvement and Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the greater study area, as well as capture their views, comments, issues and concerns regarding the project, various opportunities have been and will continue to be provided to I&APs to note their comments and issues. I&APs are being consulted through the following means:

Table 5.3: Consultation undertaken for the Woodhouse Solar PVs Grid Connection

Activity	Date
Distribution of Background Information Letter announcing the availability of the BA Report for review for a 30-day review and comment period. These letters were distributed to Organs of State, Government Departments, Ward Councillors, landowners within the greater study area (including neighbouring landowners) and key stakeholder groups.	6 September 2021
Advertising of the availability of the BA Report for a 30-day review period in Stellalander newspaper.	1 September 2021
30-day review period of the BA Report	6 September 2021 – 7 October 2021

Focus Group Meetings: » Authorities and Key Stakeholders (including organs of state, local municipality and community-based organisations)	To be confirmed during 30-day review period
On-going consultation (i.e. telephone liaison; e-mail communication) with all I&APs	Throughout BA process

iv. Registered I&APs entitled to Comment on the BA Report and Plans

43.(1) A registered I&AP is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

(2) In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.

44.(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.

(2) Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to –

(a) A lack of skills to read or write;

(b) Disability; or

(c) Any other disadvantage;

Reasonable alternative methods of recording comments must be provided for.

I&APs registered on the database have been notified by means of a notification letter (e-mail) of the release of the BA Report for a 30-day review period, invited to provide comment on the BA Report, and informed of the manner in which, and timeframe within which such comment must be made. The notification was distributed prior to commencement of the 30-day review period, on 3 September 2021.

v. Identification and Recording of Comments

Comments raised by I&APs over the duration of the BA process will be synthesised into a Comments and Responses (C&R) Report which is included in **Appendix C** of the BA Report. The C&R Report includes detailed responses from members of the EIA project team and/or the project proponent to the issues and comments raised during the public participation process.

Meeting notes of all the meetings conducted during the 30-day review period of the BA Report will be included in **Appendix C**.

5.4 Assessment of Impacts Identified through the BA Process

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of BA applications in terms of Regulation 19 and 21 of the 2014

EIA Regulations. **Table 5.4** provides a summary of the specialist's assessments identified in the Screening Report and responses to each assessment in terms of the project proposed.

Table 5.4: Specialist assessments identified in terms of the national web based environmental screening tool for the proposed development

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Agricultural Impact Assessment	Medium	The general land-use is mainly grazing of livestock/ cattle farming and energy generation. The proposed development is not anticipated to have negative impacts or distract the current land use activities. The current land use activities would continue as the land use practice indefinitely. In addition, given that the proposed project is related to linear grid connection infrastructure and is located within an area of Medium sensitivity no assessment required as per GN 320 of 2020.
Landscape/Visual Impact Assessment	Rating not provided	A Visual Impact Assessment has been undertaken for the Woodhouse Solar PVs Grid Connection and is included in this BA Report as Appendix F
Archaeological and Cultural Heritage Impact Assessment	High	This BA Report includes a Heritage Impact Assessment (including archaeology and palaeontology) which is included in this BA Report as Appendix E.
Palaeontology Impact Assessment	Very High	The Heritage Impact Assessment (Appendix E) includes an assessment of Woodhouse Solar PVs Grid Connection on palaeontological resources within the grid connection corridor.
Terrestrial Biodiversity Impact Assessment	Very High	An Ecological Impact Assessment (included as Appendix D) assesses the impact of Woodhouse Solar PVs Grid Connection on the biophysical (i.e. flora and fauna) environment identified within the grid connection corridor of the project.
Aquatic Biodiversity Impact Assessment	Very High	The Ecological Impact Assessment (Appendix D) has assessed the impacts of the proposed development on aquatic identified within the grid connection corridor.

Civil Aviation Assessment	Medium	No assessment is required. The South African Civil Aviation Authority (CAA) will be consulted in order to obtain comment from a civil aviation perspective. The applicant will also obtain the necessary CAA approvals for the grid connection infrastructure once the final position of the power line route and two collector substations within the grid connection corridor is confirmed and final.
Plant Species Assessment	Low	The Ecological Impact Assessment (Appendix D) has assessed the impacts of the proposed development on plant and animal species identified within the grid connection corridor.
Animal Species Assessment	Medium	

Impacts identified as requiring investigation, as well as the specialist consultants involved in the assessment of these impacts are indicated in **Table 5.5** below.

Table 5.5: Specialist consultants appointed to evaluate the potential impacts associated with the Woodhouse Solar PVs Grid Connection

Specialist Name	Specialist Company	Specialist Area of Expertise	Appendices
Gerhard Botha	Nkurenkuru Ecology & Biodiversity	Ecology (Terrestrial & Avifauna) and Freshwater	Appendix D
Lourens du Plessis	LOGIS	Visual	Appendix F
Jenna Lavin	CTS Heritage (Pty) Ltd	Heritage (including archaeology, cultural landscape and palaeontology)	Appendix E

Specialist studies considered direct and indirect environmental impacts associated with the development of all components of the grid connection infrastructure. Impacts were assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected;
- The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high);
- The **duration**, wherein it is indicated whether:
  - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - Medium-term (5–15 years) – assigned a score of 3;
  - Long term (> 15 years) - assigned a score of 4;
  - Permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment;
  - 2 is minor and will not result in an impact on processes;
  - 4 is low and will cause a slight impact on processes;
  - 6 is moderate and will result in processes continuing but in a modified way;

  - 8 is high (processes are altered to the extent that they temporarily cease);
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - Assigned a score of 3 is probable (distinct possibility);
  - Assigned a score of 4 is highly probable (most likely);
  - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
- The **status**, which is described as either positive, negative or neutral;
- The degree to which the impact can be reversed;
- The degree to which the impact may cause irreplaceable loss of resources;
- The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

S = (E+D+M) P; where

S = Significance weighting.
E = Extent.
D = Duration.
M = Magnitude.
P = Probability.

The **significance weightings** for each potential impact are as follows:

- **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area);
- **30-60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated);
- **> 60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area).

As the proponent has the responsibility to avoid or minimise impacts and plan for their management (in terms of the EIA Regulations, 2014 (as amended)), the mitigation of significant impacts is discussed. Assessment of impacts with mitigation is made in order to demonstrate the effectiveness of the proposed mitigation measures. Generic Environmental Management Programmes, contemplated in Regulation 19(4) of the EIA Regulations, 2014 (as amended) and as per GNR 435 of 22 March 2019 is used for the BA for the Woodhouse Solar PVs Grid Connection. This is due to the triggering of activity 11 of Listing Notice 1 of the EIA Regulations, 2014 (as amended). The generic EMPr template for substation infrastructure for electricity transmission and distribution

and the generic EMPr for overhead electricity transmission and distribution infrastructure is included in **Appendix G** to **I**[9] of this BA Report.

5.5 Assumptions and Limitations of the BA Process

The following assumptions and limitations are applicable to the studies undertaken within this BA process:

- All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
- It is assumed that the grid connection corridor identified by the developer represents a technically suitable corridor for the establishment of the grid connection infrastructure associated with the Woodhouse Solar PVs Grid Connection.
- This report and its investigations are project-specific, and consequently the environmental team did not evaluate any other grid connection technology alternatives.

Refer to the specialist studies in **Appendices D – F** for specialist study specific limitations.

5.6 Legislation and Guidelines that have informed the preparation of this Basic Assessment Report

The following legislation and guidelines have informed the scope and content of this BA Report:

- National Environmental Management Act (Act No. 107 of 1998);
- EIA Regulations of December 2014, published under Chapter 5 of NEMA (as amended);
- Department of Environmental Affairs (2017), Public Participation guidelines in terms of NEMA EIA Regulations; and
- International guidelines – the Equator Principles, the IFC Performance Standards, the Sustainable Development Goals, World Bank Environmental and Social Framework, and the and World Bank Group Environmental, Health, and Safety Guidelines (EHS Guidelines).

Table 5.6 provides an outline of the legislative permitting requirements applicable to the grid connection infrastructure as identified at this stage in the project process.

[9] Appendix K1 includes the power line EMPr and K2 includes the substation EMPr.

Table 5.6: Applicable Legislation, Policies and/or Guidelines associated with the development of the Woodhouse Solar PVs Grid Connection Infrastructure

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that: "*Everyone has the right –* » *To an environment that is not harmful to their health or well-being, and* » *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:* * *Prevent pollution and ecological degradation,* * *Promote conservation, and* * *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*."	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right however implies that environmental impacts associated with proposed development are considered separately and cumulatively. It is also important to note that the "right to an environment clause" includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (No 107 of 1998) (NEMA)	The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326). In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. A Basic Assessment Process is required to be undertaken for the proposed project.	Department of Forestry, Fisheries and the Environment DFFE) – Competent Authority North West Department of Rural, Environmental and Agricultural Development (READ) – Commenting Authority	The listed activities triggered by the proposed project have been identified and are assessed throughout the BA process for the grid connection infrastructure. The BA process will culminate in the submission of a final BA Report to the competent authority in support of the Application for Environmental Authorisation.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Environmental Management Act (No 107 of 1998) (NEMA)	In terms of the "Duty of Care and Remediation of Environmental Damage" provision in Section 28(1) of NEMA every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.	DFFE North West (READ)	While no permitting or licensing requirements arise directly by virtue of the proposed grid connection infrastructure, this section finds application through the consideration of potential cumulative, direct, and indirect impacts.
Environment Conservation Act (No. 73 of 1989) (ECA)	The Noise Control Regulations in terms of Section 25 of the ECA contain regulations applicable for the control of noise in the Provinces of Limpopo, North West, Mpumalanga, Northern Cape, Eastern Cape, and KwaZulu-Natal Provinces. The Noise Control Regulations cover the powers of a local authority, general prohibitions, prohibitions of disturbing noise, prohibitions of noise nuisance, use of measuring instruments, exemptions, attachments, and penalties. In terms of the Noise Control Regulations, no person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof (Regulation 04).	DEA (soon to be known as DEFF) North West (READ)	Noise impacts are expected to be associated with the construction phase of the project. Considering the location of the grid connection corridor in relation to residential areas and provided that appropriate mitigation measures are implemented, construction noise is unlikely to present a significant intrusion to the local community. There is therefore no requirement for a noise permit in terms of the legislation.
National Water Act (No. 36 of 1998) (NWA)	A water use listed under Section 21 of the NWA must be licensed with the Regional DWS, unless it is listed in Schedule 1 of the NWA (i.e. is an existing lawful use), is	Regional Department of Water and Sanitation	A diffused drainage line and depression wetland slightly overlaps with the grid connection corridor.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	permissible under a GA, or if a responsible authority waives the need for a licence. Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. Consumptive water uses may include taking water from a water resource (Section 21(a)), and storing water (Section 21(b)). Non-consumptive water uses may include impeding or diverting of flow in a water course (Section 21(c)), and altering of bed, banks or characteristics of a watercourse (Section 21(i)).		Where development activities impede or divert the flow of water in a watercourse, or alter the bed, banks, course or characteristics of a watercourse, Section 21(c) and 21 (i) of the NWA would be triggered, and the project proponent would need to apply for a WUL or register a GA with the DWS.
Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)	In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit.	Department Mineral Resources	Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the grid connection infrastructure, and as a result a mining permit or EA is not required to be obtained.
	Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.		In terms of Section 53 of the MPRDA, approval is required from the Minister of Mineral Resources to ensure that the proposed grid connection infrastructure does not sterilise a mineral resource that

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			might be present within the grid connection corridor.
National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)	The National Dust Control Regulations (GNR 827) published under Section 32 of NEM:AQA prescribe the general measures for the control of dust in all areas, and provide a standard for acceptable dustfall rates for residential and non-residential areas. In accordance with the Regulations (GNR 827) any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dustfall standard set out in Regulation 03 must, upon receipt of a notice from the air quality officer, implement a dustfall monitoring programme. Any person who has exceeded the dustfall standard set out in Regulation 03 must, within three months after submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval.	North West (READ) / Dr Ruth Segomotsi Mompati District Municipality	In the event that the construction of the grid connection infrastructure results in the generation of excessive levels of dust, the possibility could exist that a dustfall monitoring programme would be required for the project, in which case dustfall monitoring results from the dustfall monitoring programme would need to be included in a dust monitoring report, and a dust management plan would need to be developed. However, with mitigation measures implemented, construction of the grid connection infrastructure is not anticipated to result in significant dust generation.
National Heritage Resources Act (No. 25 of 1999) (NHRA)	Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance. Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites. Section 36 of the NHRA provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority. Section 38 of the NHRA lists activities which require developers or any person who intends to undertake a	South African Heritage Resources Agency North West Provincial Heritage Resource Agency (NWPHRA)	A full Heritage Impact Assessment (HIA) (with field work) has been undertaken as part of the BA process (refer to **Appendix E** of this BA Report). The HIA considers impacts on both archaeology, heritage and palaeontology. The grid connection infrastructure will have an impact on the heritage resources located within the grid connection corridor. Although the identified heritage sites are of low significance, pylon placements will have to be placed to avoid the identified site/s.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	listed activity to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development. Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction.		Should a heritage resource be impacted upon, a permit may be required from SAHRA in accordance with Section 48 of the NHRA, and the SAHRA Permit Regulations (GNR 668). This will be determined once the final location of the grid connection infrastructure within the grid connection corridor has been determined.
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process. Three government notices have been published in terms of Section 56(1) of NEM:BA as follows: » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable and protected species (GNR 151). » TOPS Regulations (GNR 152). It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 37596, GNR 324), 29 April 2014).	DFFE North West READ	Under NEM:BA, a permit would be required for any activity that is of a nature that may negatively impact on the survival of a listed protected species. The Ecological Impact Assessment (**Appendix D**) As such the potential occurrence of critically endangered, endangered, vulnerable, and protected species and the potential for them to be affected has been considered. A permit may be required should any listed plant species be disturbed or destroyed.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEM:BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out. Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).	DFFE North West READ	Restricted Activities and the respective requirements applicable to persons in control of different categories of listed invasive species are contained within the Alien and Invasive Species Regulations (GNR 598) published under NEM:BA, together with the requirements of the Risk Assessment to be undertaken. The EMPr (**Appendix G** to **I**) does make provision for mitigation measures for alien vegetation present within the grid connection corridor.
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)	Section 05 of CARA provides for the prohibition of the spreading of weeds. Regulation 15 of GNR 1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur. Regulation 15E of GNR 1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species.	Department of Agriculture, Forestry and Fisheries	CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented. In terms of Regulation 15E (GNR 1048) where Category 1, 2 or 3 plants occur a land user is required to control such plants by means of one or more of the following methods: » Uprooting, felling, cutting or burning. » Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			» Biological control carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation. » Any other method of treatment recognised by the executive officer that has as its object the control of plants concerned, subject to the provisions of sub-regulation (4). » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.
National Forests Act (No. 84 of 1998) (NFA)	According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734. The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister".	DFFE	A licence is required for the removal of protected trees. It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the grid connection corridor that cannot be reasonably avoided for the submission of relevant permits to authorities prior to the disturbance of these individuals. The Ecological Impact Assessment undertaken as part of the BA Report included a site visit which allowed for the identification of any protected tree species that may require a license in terms

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			of the NFA within the project development corridors (refer to **Appendix D** of this BA Report).
National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)	Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it. Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.	DAFF (soon to be ALR)	While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the grid connection infrastructure, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and personnel for firefighting purposes.
Hazardous Substances Act (No. 15 of 1973) (HAS)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in	Department of Health	It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may present with the development of the grid connection infrastructure and in what operational context they are used, stored or handled. If applicable, a license would

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	relation to the degree of danger, to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product, and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.		be required to be obtained from the Department of Health.
National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of NEM:WA (GNR 912), a BA or EIA is required to be undertaken for identified listed activities. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:	DFFE – Hazardous Waste North West READ – general waste	No listed activities are triggered by the grid connection infrastructure and therefore no Waste Management License is required to be obtained. General and hazardous waste handling, storage and disposal will be required during construction and operation of the grid connection infrastructure. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)(c) of NEM:WA will need to be considered in this regard.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	» The containers in which any waste is stored, are intact and not corroded or in » Any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise, and » Pollution of the environment and harm to health are prevented.		
National Road Traffic Act (No. 93 of 1996) (NRTA)	The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.	SANRAL – national roads North West Department of Community Safety and Transport	An abnormal load / vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads (transport vehicles exceeding the dimensional limitations (length) of 22m). Depending on the trailer configuration and height when loaded, some of the substation components may not meet specified dimensional limitations (height and width) and will therefore require a permit.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Provincial Policies / Legislation		
Bophuthatswana Nature Conservation Act. No. 3 of 1973.	This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; provides for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other authorisations. Amongst other regulations, the following may apply to the current project: » Boundary fences may not be altered in such a way as to prevent wild animals from freely moving onto or off of a property; » Aquatic habitats may not be destroyed or damaged; » The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to eradicate or destroy such species; The Act provides lists of protected species for the Province.	North West READ	A collection/destruction permit must be obtained from North West Department of Rural, Environment and Agricultural Development for the removal of any protected plant or animal species found on site. During the survey no plant SCC was recorded. However, three provincially protected species were recorded, namely; *Boophone disticha, Babiana bainesii, Aloe grandidantata*, Refer to the Ecological Impact Assessment (**Appendix D**).

CHAPTER 6. DESCRIPTION OF THE RECEIVING ENVIRONMENT

This chapter provides a description of the environment that may be affected by the development of the Woodhouse Solar PVs Grid Connection. This information is provided in order to assist the reader in understanding the possible effects of the project on the environment within which it is proposed to be developed. Aspects of the biophysical and social environment that could be directly or indirectly affected by, or could affect, the grid connection infrastructure have been described. This information has been sourced from both existing information available for the area as well as collected field data by specialist consultants and aims to provide the context within which this BA process is being conducted.

6.1 Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of BA Reports:

Requirement	Relevant Section
3(h)(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, heritage and cultural aspects	The environmental attributes associated with the grid connection corridor and the broader environment are described and considered within this chapter and include the following: » The regional setting within which the grid connection corridor is located is described in section 6.2. » The climatic conditions of the Vryburg area are described in section 6.4. » The biophysical characteristics of the broader study area and the surrounding areas, as well as for the grid connection corridor, are described in section 6.5. This includes the topography, soils and agricultural potential, the ecological profile (including fauna, flora and avifauna) of the broader study and the grid connection corridor. » The heritage of the affected environment (including archaeology, palaeontology and cultural landscape) is discussed in section 6.6. » The visual quality of the affected environment is discussed in section 6.6. » The social context within which the grid connection corridor is located is described in section 6.8.

A more detailed description of each aspect of the affected environment is included in the specialist reports contained within the **Appendices D - F**.

6.2. Regional setting

The North West Province shares its boundaries with the Free State, Limpopo, and Gauteng provinces, and is the gateway to Botswana. It covers an area of ~104 882km². Much of the Province consists of flat areas of scattered trees and grassland. The Vaal River flows along the southern border of the province.

Mahikeng (previously Mafikeng) is the capital, and the largest towns are Mmabatho, Potchefstroom and Klerksdorp. The North West Province is divided into four district municipalities which include: Bojanala District Municipality, Ngaka Modiri Molema District Municipality, Dr Ruth Segomotsi District Municipality and Dr Kenneth Kaunda District Municipality, which are further subdivided into 23 local municipalities (refer to **Figure 6.1**).

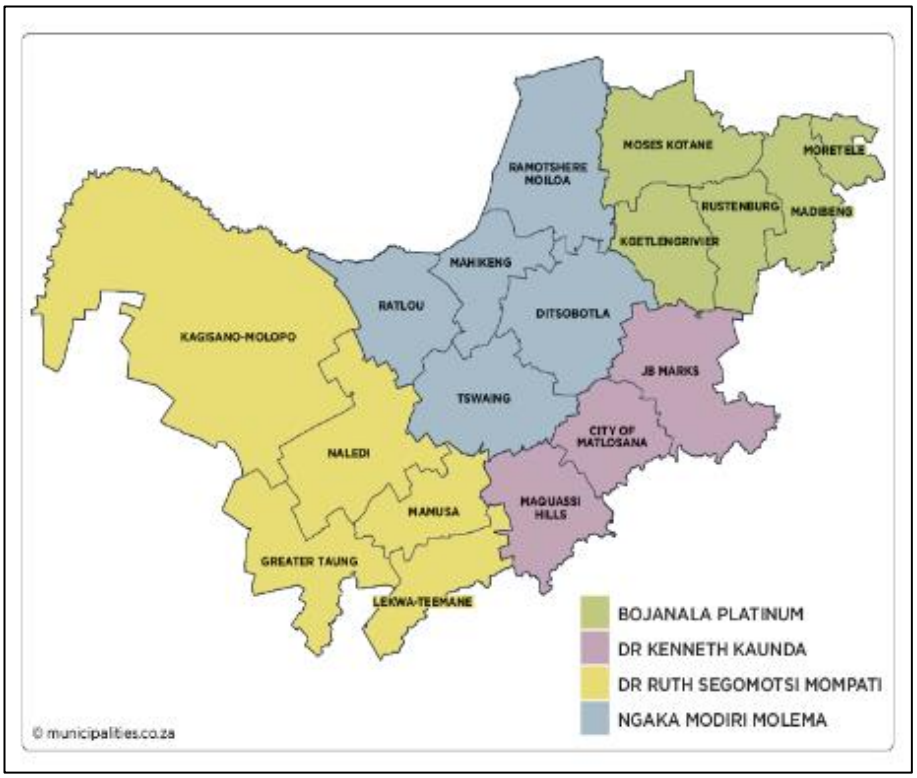

Figure 6.1: District municipalities of the Northern West Province (Source: Municipalities of South Africa).

The Dr Ruth Segomotsi Mompati District Municipality (previously Bophirima District Municipality) is a Category C municipality located in the North West Province. It is bordered by Ngaka Modiri Molema and Dr Kenneth Kaunda in the north, and John Taolo Gaetsewe in the south, which is a cross-boundary within the Northern Cape. It is the largest district in the province, making up almost half of its geographical area.

The district municipality comprises five local municipalities. It is one of four districts in the province, with poor rural areas, formerly situated in the former Bophuthatswana homeland. With the population situated in more than 470 villages and towns dispersed in a 250km radius (approximately 50km north to south and 200km east to west), this district presents unique management and organisational challenges.

The Dr Ruth Segomotsi Mompati District Municipality includes the town of Vryburg. Vryburg is a large agricultural town with a population of 48,400. The name *Vryburg* comes from the period in the 1882 when Vryburg was established as the capital of the Republic of Stellaland. The Republicans called themselves *Vryburgers* ("free citizens"), and since the Afrikaans word for "citizen" is *burger* and the word for "borough" (or "fortress") is *burg* the name of the town followed. A site for the township was selected and named Endvogelfontein, being changed later to Vryburg.

Other prominent cities and towns located within the Dr Ruth Segomotsi Mompati include, Amalia, Bloemhof, Christiana, Piet Plessis, Pomfret, Pudimoe, Reivilo, Schweizer-Reneke, Stella, and Taung. The main

economic activities include community services, agriculture, finance, trade, transport, manufacturing, mining, and construction.

The Dr Ruth Segomotsi Mompati comprises five (5) local municipalities (LMs), namely Naledi, Greater Taung, Kagisano-Molopo, Mamusa and Lekwa-Teemane (refer to **Figure 6.2**).

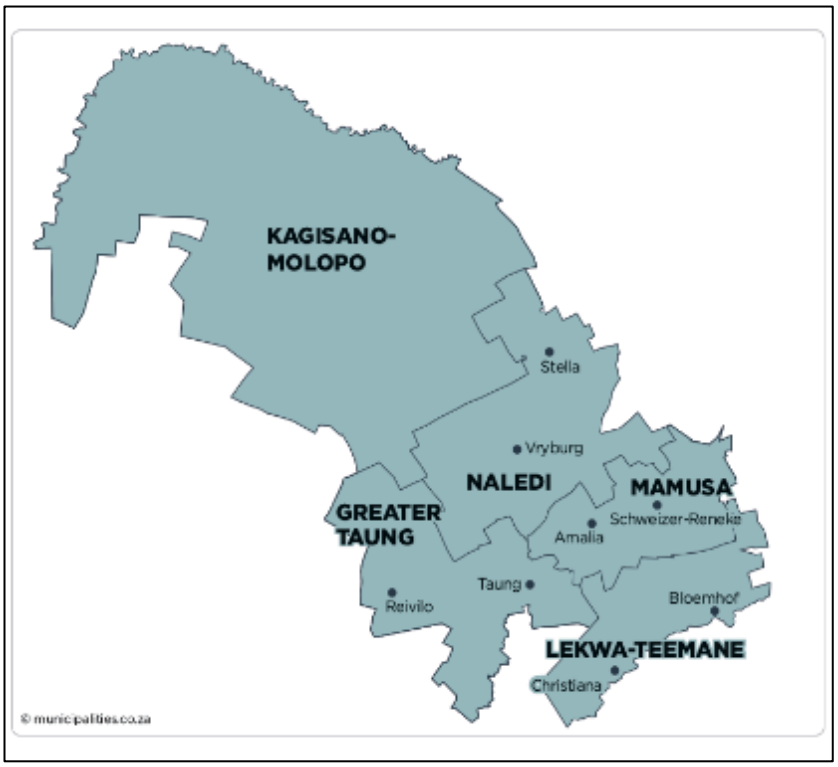

Figure 6.2: Local Municipalities of the Dr Ruth Segomotsi Mompati District Municipality (Source: Municipalities of South Africa).

The grid connection corridor is located within the Northern Corridor of the Strategic Transmission Corridors which is one of five corridors identified for the rollout of large-scale electricity transmission and distribution infrastructure. The grid connection corridor is also located within Zone 6 of the Renewable Energy Development Zones (REDZ), otherwise known as the Vryburg REDZ, which has been earmarked for the development of large scale solar photovoltaic energy facilities.

6.3. Geographical Setting: Location and description of the Broader Study area and the Development Area

The project site for the proposed grid connection infrastructure is located approximately 5km south-east of Vryburg. The project site is located west of the R34. A secondary main road, known as the Amalia Road is located parallel to the grid connection corridor. Two national roads are located within the vicinity of the project site, including the N14 which is located to the north of the project site and the N18 located to the west of the project site and west of the Amalia Road. This enables relatively easy access to the site. Within the vicinity of the project site and the surrounding areas other existing infrastructure is present which includes power lines and substations. The Delareyville Munic-Vryburg, and existing Woodhouse Substation is located north of the proposed development area. The Bophirma Substation and its associated infrastructure is located within the proposed development area.

The associated farm portions for the development of the grid connection infrastructure are owned by private landowners, which primarily used the land for livestock grazing and renewable energy developments. No inhabitants are currently residing within the proposed grid connection development area.

6.4 Climatic Conditions

The climate of Vryburg has the following characteristics:

i. rainfall occurs mainly in summer and autumn with very dry winters;
ii. the mean annual rainfall is about 477 mm with January being the wettest month averaging at approximately 477 mm with January being the wettest month averaging at about 89 mm and July being the driest with an average of only 4 m;
iii. the average annual temperature in Vryburg is 17.9 °C with January being the warmest (Ave. 24.8 °C) and July being the coldest (Ave 9.3 °C); and
iv. frost is frequent to very frequent in winter (mean frost days: 40).

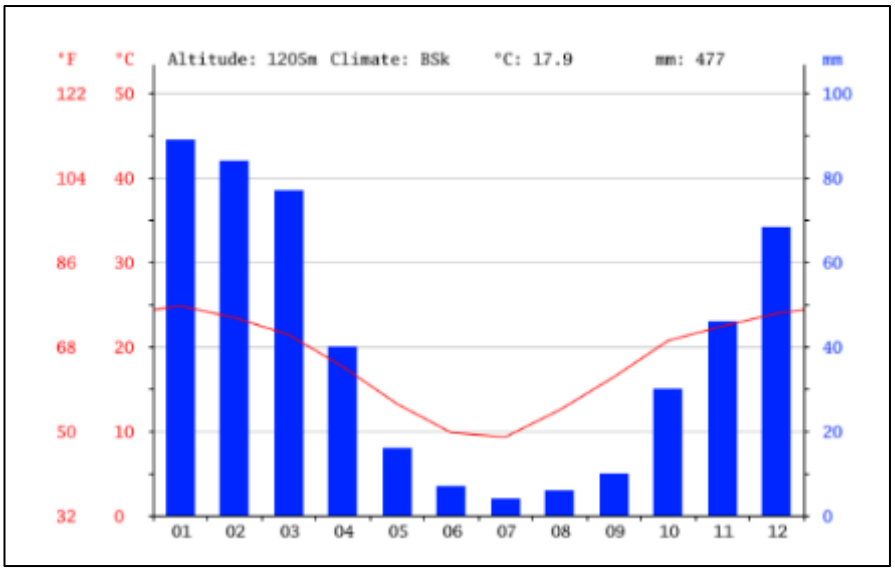

Figure 6.3: Climate graph for the town of Vryburg, North West Province

6.5. Biophysical Characteristics of the broader study area and grid connection corridor

6.5.1. Topography and Soils

The region within which the project site is located can be described as a flat plateau. The average slope of the area is between 0% and 2%. The development area is situated at elevations of between 1 197m and 1 230m above sea level with an average slope of less than 1.5% and a maximum slope of 5.8%. The largest portion and central part of the site is situated on a relatively flat plateau with gradual slopes towards lower lying areas to the north, south and the north-west of the site.

The topography can be described as gently undulating with the head of the valley being approximately 60m above the valley floor. Minor ridgelines that extend into the valley in the vicinity of the site are approximately 20 – 30m above the valley floor. The proposed project site straddles two low ridgelines close to the head of the valley on the eastern side of the main watercourse.

The underlying geology of the study area is dominated by andesite and basalt lavas of the Ventersdorp Supergroup. Quartzite of the Vryburg formation and Dwyka tillite occur sporadically in places. Dolerite, diabase and calcrete may also be spread across the proposed site.

The most relevant landtype and soil properties of the site are described below:

- Land type Ae covers a large area of the proposed site. Soils of this land type are red and yellow well-drained sandy soils with a high base status found directly on semi-shallow underlying rock. Rock-soil complexes cover a large percentage of the area. An orthic A horizon is mostly found directly on top of hard rock, or on a red apedal B and seldom on a yellow-brown apedal B. The B horizon may contain fragments of the eroded mother material. High clay content B horizons are also present and occupy ~ 10% of the area. Soils of this type form part of the Shortlands soil form.
- Land type Ag is rocky with almost 20% rock outcrops present. Shallow Mispah and Glenrosa soil forms are abundantly found. Some red and yellow well-drained sandy soil with high base status may occur in places.

6.5.2. Ecological Profile of the Grid Connection Corridor

The proposed development area have already been subject to varying degrees of disturbance and degradation caused by past and present land-use practises. Evidence of high stocking rates and grazing pressure is apparent. The dominance of *Eragrostis rigidior* in the area is an indication of past disturbance and overgrazing. Disturbances within the area also include the existing Eskom overhead power lines, a network of service and farm gravel roads, Amalia Main Road located adjacent to the development area, the regional road (R34) located to the east of the development area, boundary fences surrounding the development area properties and the Woodhouse and Bophirima Substations.

i. Habitats and Vegetation types

The vegetation in and surrounding the study area is Ghaap Plateau Vaalbosveld (SVk 7). The distribution of the vegetation type is spread across the Northern Cape and North West Province, from the area close to Campbell in the south east of Danielskuil through Reivilo to around Vryburg in the north. This vegetation type has been described by Mucina and Rutherford (2006) as a flat plateau with well-developed shrub layer with *Tarchonanthus camphoratus* and *Acacia karroo*. Open tree layer has *Olea europaea subsp. africana, A. tortilis, Ziziphus mucronata* and *Searsia lanceae*. Olea is more important in the southern parts of the unit, while *A. tortilis, A. hebeclada* and *A. mellifera* are more important in the north and part of the west of the unit. Much of the south-central part of this unit has remarkably low cover of Acacia species for an arid savanna and is dominated by the non-thorny *T. camphoratus, R. lanceae* and *O. europaea subsp. africana*.

According to Mucina and Rutherford (2006) none of the vegetation type associated with the project site (i.e. Ghaap Plateau Vaalbosveld) is protected within formal conservation areas, but only 1% of this unit has been transformed. The conservation status of this unit is classified as Least Threatened and is not listed under the National List of Ecosystems that are Threatened and in need of protection (GN1002 of 2011), published under the National Environment Management: Biodiversity Act (Act No. 10 of 2004)

From a fine scale vegetation prespective, the development area is situated within a very uniform habitat with little variation in terms of geology, pedology, slope etc. Subsequently the vegetation also depicts this flat monotonous habitat consisting out of a single vegetation unit consistent with the vegetation classification provided by Mucina & Rutherford (2006) (Ghaap Plateau Vaalbosveld).

ii. Freshwater Resources

The project site is situated in the catchment areas of the Losase River and the Droë Harts River. Non-perennial (ephemeral) watercourses traverse the farm property most of which flow in a north to south and north-east to south-east direction. Freshwater resources located within close proximity of the grid connection corridor includes a largely natural Depression Wetland (pan) slightly overlapping within the southern section of the grid connection corridor, and a moderately modified Diffuse Draining Line overlaps with the northern section of the grid connection corridor (refer to **Figure 6.4**).

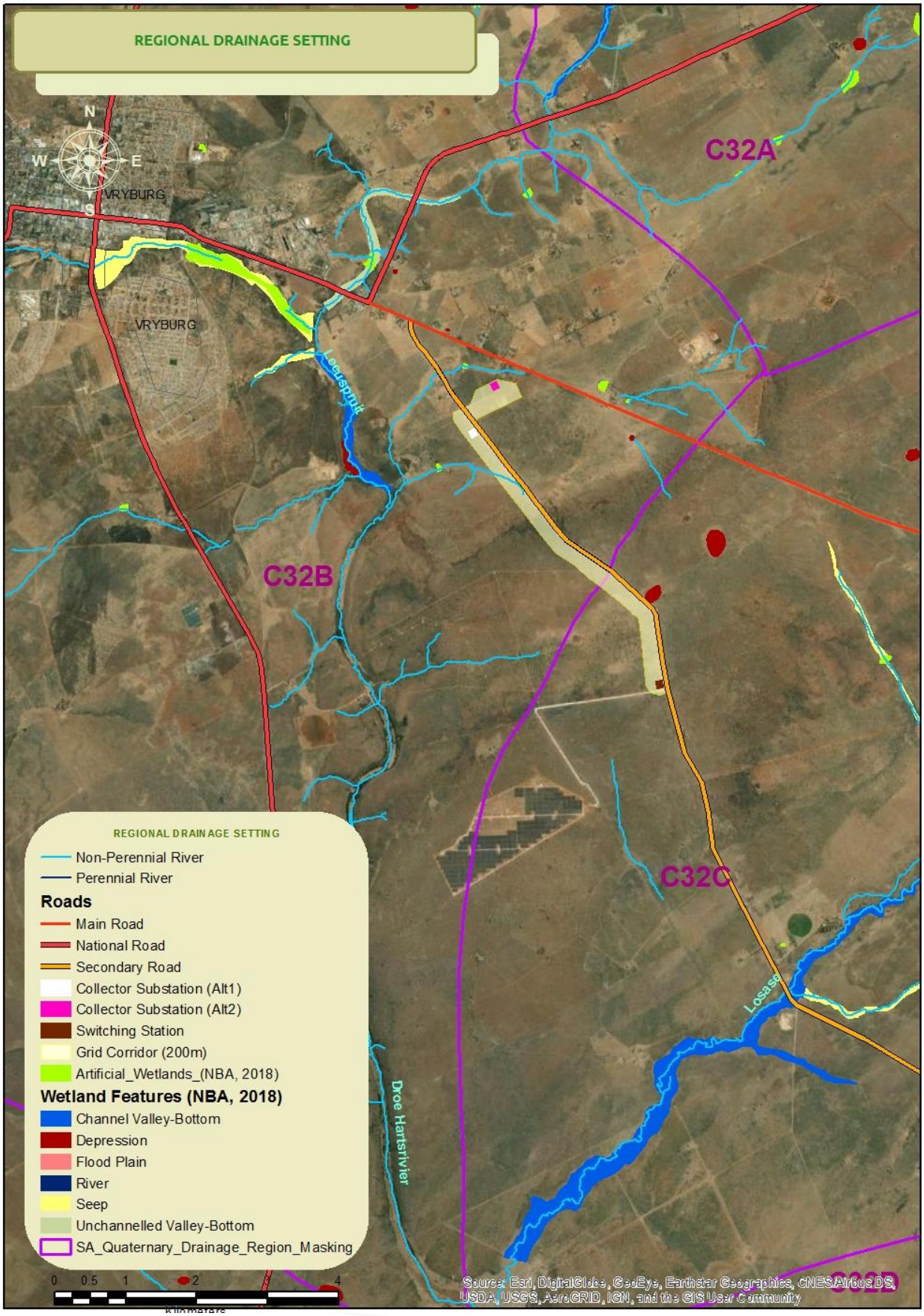

Figure 6.4: Regional Drainage setting

iii. Listed Plant Species

A species list was obtained from POSA for the relevant degree grids (http://posa.sanbi.org, Grid reference 2624 and 2724). The species on this list were evaluated to determine the likelihood of any of them occurring in the study area. Of the species that are considered to occur within the geographical area under consideration, there were 19 species which are regarded conservation-worthy. Three species recorded in the degree grids are listed on the Red List plant species. According to the South African Red List Categories, one is listed as Rare (*Gnaphalium nesonii*), one Vulnerable (*Rennera stellata*) and one Near Threatened (*Lithops lesliei*). *Boscia albitrunca* is the only tree species protected according to the National Forest Act (NFA) and from a broader perspective that may potentially occur within the broader study area surrounding the project site (however the presence of the species within the project site has not been recorded). The remaining 15 species are protected within the Transvaal Nature Conservation Ordinance (TNCO) and Bophuthatswana Nature Conservation Act (BNCA).

A total of four conservation-worthy species have noted within the surrounding area namely:

- *Aloe grandidentata* (TNCO & BNCA)
- *Ammocharis coranica* (TNCO & BNCA)
- *Acacia erioloba* (NFA)
- *Boophone disticha* (Declining)

Of the four conservation worthy species, *Aloe grandidentata* (succulent) and *Ammocharis coranica* (geophyte) were quite prominent within this unit and was regularly encountered. *Acacia erioloba* (tree) as well as *Boophone disticha* (geophyte) were sparsely distributed through this unit. The aloe species as well as the geophytic species can be easily removed and transplanted.

iv. Critical Biodiversity Areas (CBA) and Broad-Scale Processes

The CBAs as listed in the North West Biodiversity Sector Plan (2015) are based on information mapped at a desk-top level, and based on an extrapolation of data collected for similar areas (similar abiotic and biotic environment) in the Dr Ruth Segomotsi Mompati District. The ecological field data collected for previous ecological studies within the project site suggested that it can be considered reasonable that the areas shown as terrestrial CBA corridors which traverse the site have a low contribution to the functioning of the corridor. The study concluded that due to the level of anthropogenic disturbance in the corridors, these would not be required to be excluded from the developable area.

Figures 6.5 and **6.6** below provide maps of the desk-top CBAs identified through the North West Biodiversity Sector Plan (2015) which overlap with the proposed Woodhouse Solar PVs Grid Connection.

The proposed grid connection corridor alternative 1 overlaps with a Terrestrial CBA 1 in the southern section of the corridor, whereas grid connection corridor alternative 2 overlaps with a Terrestrial CBA 1 in both the southern and northern sections of the corridor. Both grid configurations overlap with a Terrestrial CBA 2 and Aquatic CBA 1 in the central area of the proposed corridor.

However, as part of the site survey undertaken, it was determined that this area was severely encroached with *Senegalia mellifera*, contained a very low diversity of plant species with no range restricted or

conservation important plants, and the identified Aquatic CBA 1 wetlands is located just outside of the grid connection corridor.

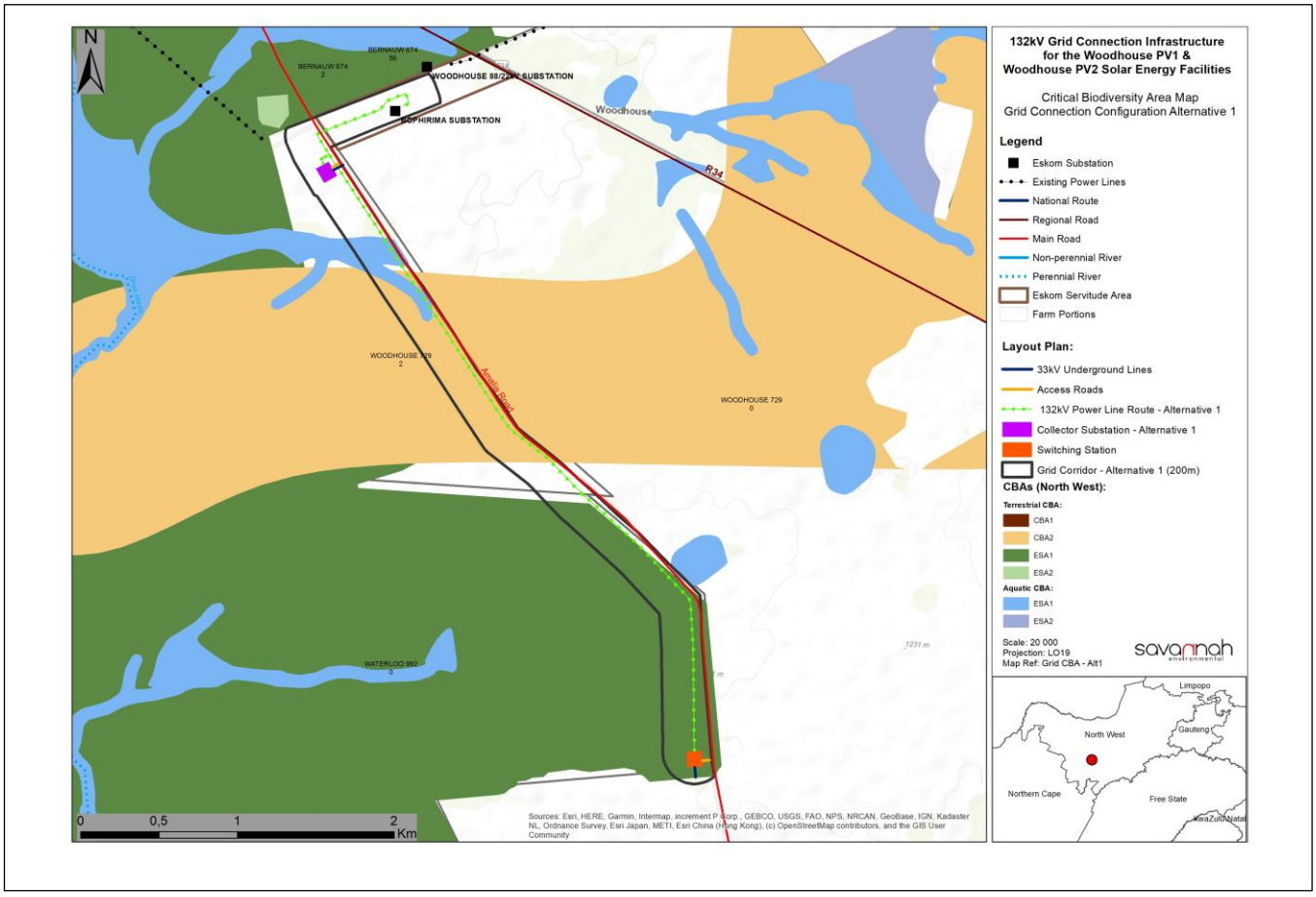

Figure 6.4: Desk-top CBAs identified through the North West Biodiversity Sector Plan (2015) which overlap with the proposed Woodhouse Solar PVs Grid Connection Alternative 1.

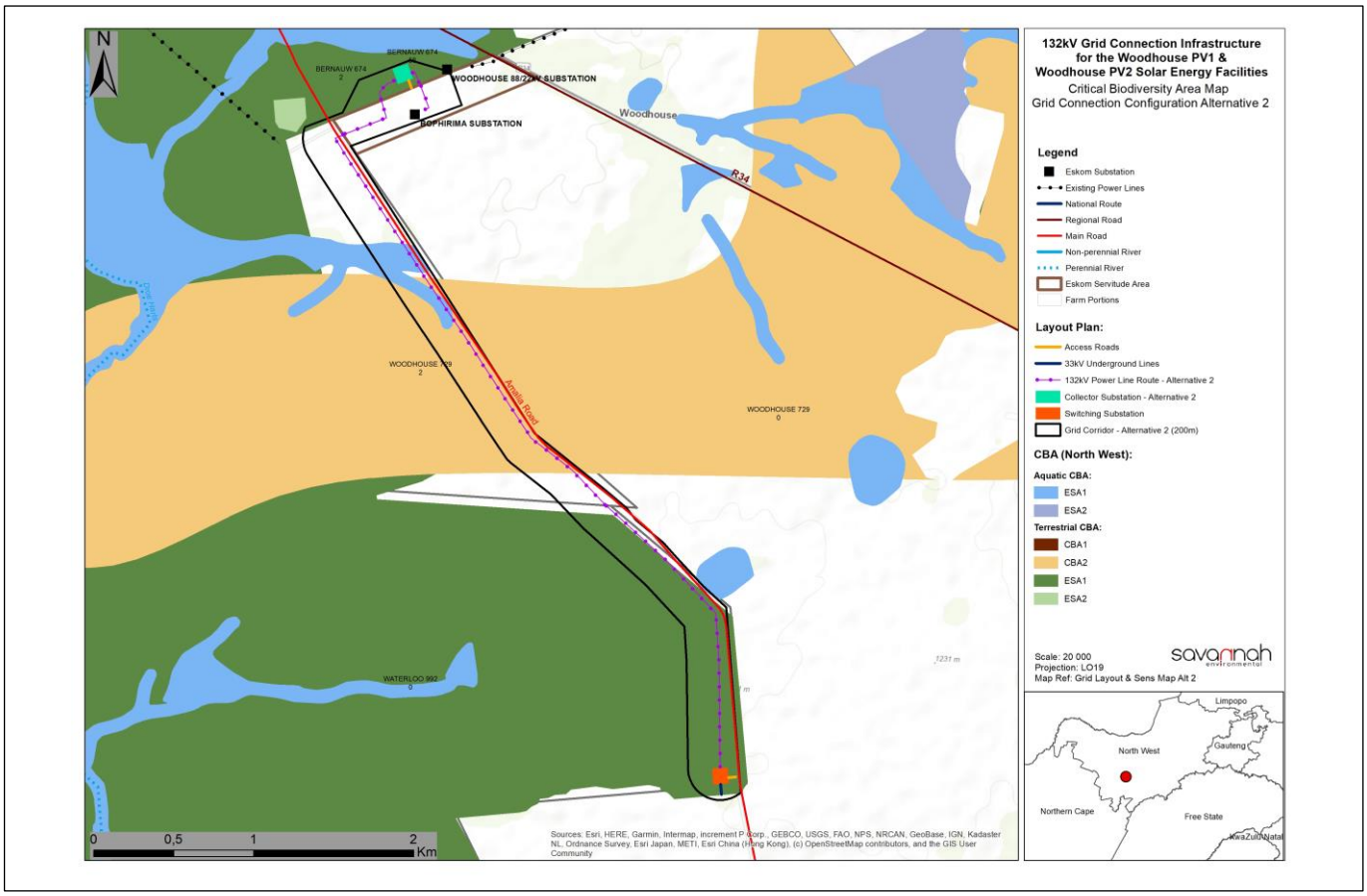

Figure 6.6: Desk-top CBAs identified through the North West Biodiversity Sector Plan (2015) which overlap with the proposed Woodhouse Solar PVs Grid Connection Alternative 2.

v. Terrestrial Fauna

Mammals

Although the potential diversity of mammals within the broader study area is high with, as many as 55 terrestrial mammals and 9 bat species present, there are several factors which have reduced the actual number of species present within the project site. This includes the proximity to the town of Vryburg and vehicle movement along the roads (including the R34 and the unsurfaced Amalia road) in the area.

Listed mammals which may occur in the area include the White-tailed Mouse Mystromys albicaudatus (Endangered), Brown Hyena *Hyaena brunnea* (Near Threatened), Black-footed Cat *Felis nigripes* (Vulnerable), Honey badger *Mellivora capensis* (IUCN LC, SA RDB EN), South African hedgehog *Atelerix frontalis* (SA RDB NT) and Ground Pangolin *Smutsia temminckii* (VU). None of these species have been recorded during previous surveys.

None of these species noted are listed and or protected species. Furthermore most of these species are highly mobile and will move away from the construction activities associated with the development and may move back during the operation phase of the grid connection infrastructure.

Reptiles

Of the 27 reptilian species that have been recorded with the 2624 and 2724 degree grids, eight species have been recorded within the quarter degree grids (2624DD, 2724BB). None of these species are listed as Red Data species.

15 Amphibian species have been recorded within the degree grids and of these 15 species eight species were recorded for the quarter degree grids (QDG) within which the study area is located. One near threatened species (*Pyxicephalus adspersus*, Giant Bull Frog) has been recorded for the quarter degree grid square (QDGS). Although this species was not recorded for the QDGS, it is still likely for this species to occur within the project site where suitable habitat (pans, wetlands or drainage lines) are available.

vi. Avifauna

The project site is not considered as a unique habitat in the landscape and has already been subject to varying degrees of transformation and degradation. Overall, the avifauna of the project site and the broader impact zone of the facility is not considered unique and is typical of what occurs across large areas of the Savannah Biome, which therefore suggests that, from an avian perspective, the area is not of any great significance.

Avian Microhabitats

The project area has already been subject to varying degrees of disturbance and degradation caused by past and present land-use practises. Evidence of high stocking rates and grazing pressure is apparent. There is also a network of minor farm roads throughout the surrounding area and specifically the proposed development area, which borders the Amalia Main Road. The proposed development area is also surrounded by existing grid connection infrastructure. The following habitats have been identified at the project site:

- Cultivated/modified land: This habitat unit makes up a large majority of the proposed development area. Although this habitat unit is considered disturbed due to human modification, it represents a significant feeding area for many bird species. The land preparation process opens up the soil and makes insects, seeds, bulbs and other food sources readily accessible to birds.

- Vaalbos shrubland: This habitat unit represents the majority of the vegetation present within the project site (Ghaap Plateau Vaalbosveld) and is largely made up of extensive plains of low shrubs *Tarchonanthus camphoratus* (an encroaching species in overgrazed or disturbed veld – which is evident in the area surrounding the proposed development). This habitat unit does not support high diversity and abundance of bird species.

- Bushveld: This habitat unit is found patchily throughout the project and is characterised by a mix of larger trees, shrubs and interspersed open plains. The higher biomass and structural and compositional variation in the vegetation supports a high diversity and abundance of bird species, with large trees potentially providing roosting and nesting for many bird species (no important roosting or nesting sites were however recorded in the project site).

- Ephemeral Seepage Wetland: There is a largely natural seepage wetland (which will only hold water after heavy rains) located just outside the grid connection corridor that are considered

important from an avian perspective. This habitat unit is important for numerous species, as it is a reliable source of surface water in the area and because the vegetation supports numerous wetland bird species.

» Drainage line: A tributary of the Losase River traverses the northern section of the grid connection corridor and although it may seldom contain surface water, it is important for ecosystem functioning. The slightly deeper soils support a marginally higher biomass including woody species and provide a structural and compositional variation in the vegetation to the surrounding shrublands

Collision-prone and red-listed species

The birds of greatest potential relevance and importance in terms of the possible impacts of the power infrastructure are likely to be local populations of threatened or endemic passerines (Ant-eating Chat *Myrmecocichla formicivora* and Cape Longclaw *Macronyx capensis*), shy ground-nesting species (Burchell's Courser *Cursorius rufus* and Double-banded Courser *Rhinoptilus africanus*), resident or visiting large terrestrial birds (Secretarybird *Sagittarius serpentarius*, Abdim's Stork *Ciconia abdimii*, Black Stork *Ciconia nigra* and Blue Crane *Anthropoides paradieus*), resident or passing raptors (Martial Eagle *Polemaetus bellicosus*, Tawny Eagle *Aquila rapax*, Lanner Falcon *Falco biarmicus* and Red-footed Falcon *Falco vespertinus* and White-back Vulture) and transient waterbirds (Greater Flamingo, Lesser Flamingo *Phoenicopterus* minor, South African Shelduck *Tadorna cana* and Yellow-billed Stork *Mycteria ibis*).

6.6. Integrated Heritage including Archaeology, Palaeontology and the Cultural Landscape

6.6.1 Heritage and the cultural landscape

No known built environment or historically significant heritage resources are known to be located in close proximity to the proposed grid connection corridor. This landscape is therefore not pristine and is already anticipated to be dominated by renewable energy infrastructure.

6.6.2. Archaeology

The development area has been thoroughly assessed for impacts to heritage resources in an Archaeological Impact Assessment conducted by Van der Walt (2016, SAHRIS NID 374639) and a Palaeontological Impact Assessment by Becker (2016, SAHRIS NID 374641, related to the Woodhouse Solar 1 and 2 PV Facilities. These reports are referred to below in order to determine the likely heritage sensitivity of the area proposed for the development of the grid connection. According to Van der Walt (2016); "MSA (Middle Stone Age) artefacts are observed in low densities scattered over most of the study area (for the previous studies undertaken for the Woodhouse Solar 1 and 2 PV Facilities) but identified the most significant resources within the area proposed for Woodhouse PV 1. In most areas, the artefacts are covered by apedal soils and more artefacts could occur sub-surface. Low density (less than 2 artefacts per 5m^2) isolated artefacts were recorded as find spots although discrete stone age sites were also recorded. In the southwestern portion of the study area, several rectangular stone ruins were recorded with associated stone cairns". Sites 407 and 408 recorded by Van der Walt (2016) mark a dense scatter of MSA and LSA (Later Stone Age) lithics. As the MSA and LSA are not well dated in this area, Van der Walt (2016) argued that these sites have higher heritage significance as they are located within a dateable context. The stone

cairns (Sites 405, 411 and 416) identified by Van der Walt (2016) could be grave markings and as such are treated as human remains (Grade IIIA). None of these identified resources are anticipated to be negatively impacted by the proposed development of the grid connection.

Archaeological resources of significance (Grade IIIc) have been identified in the area immediately adjacent to the proposed grid connection corridor and as such, it is likely that additional archaeological resources of significance may be located within the grid connection corridor (refer to **Figure 6.7**).

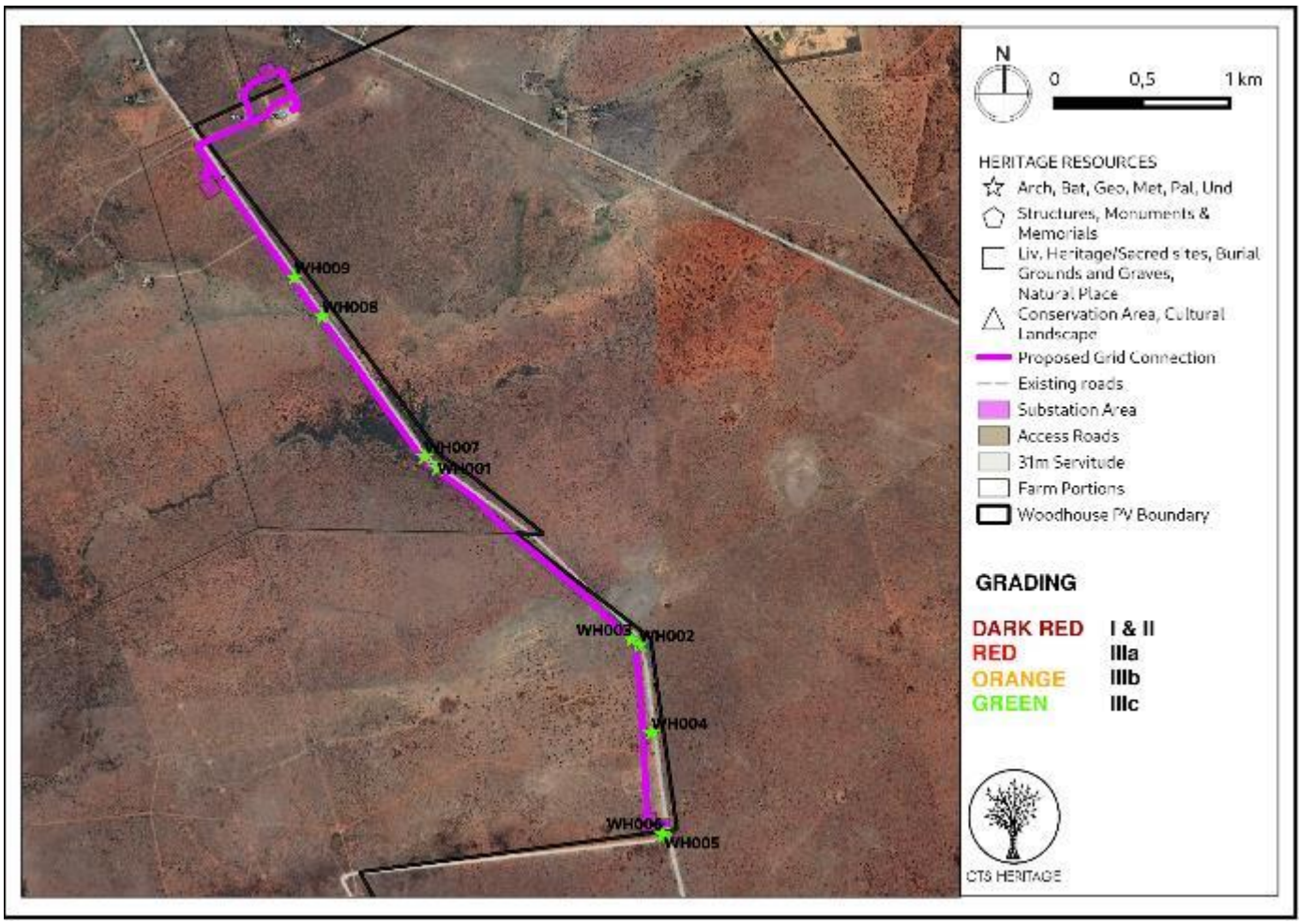

Figure 6.7: Map of heritage resources identified relative to the grid connection corridor

6.6.3. *Palaeontology*

According to the SAHRIS Palaeosensitivity Map, the area proposed for the grid connection corridor is underlain by sediments of very high and moderate palaeontological sensitivity (refer to **Figure 6.8**). According to the extract from the CGS 2724 Christiana Map indicating that the development area is underlain by sediments of the Vryburg Formation (Ghaap Group) and Dwyka Group of the Karoo Supergroup. According to Becker (2016); "The geologically older Vryburg Formation consists of fluvial and shallow marine quartzites, mudrocks and conglomerates, while the Dwyka Group consists of Permo-carboniferous glacial sediments. The Dwyka Group (Karoo Supergroup) is represented by small outcrops in the north of the development footprint. Although trace fossils and plants could be present in the Dwyka Group the likelihood of significant fossil heritage in the Vryburg area is considered to be low. The southern portion of the development footprint consists of the Vryburg Formation, which is considered as

unfossiliferous in this area. Therefore, there are no areas located within the development footprint considered as sensitive." These findings directly pertain to the proposed grid connection corridor.

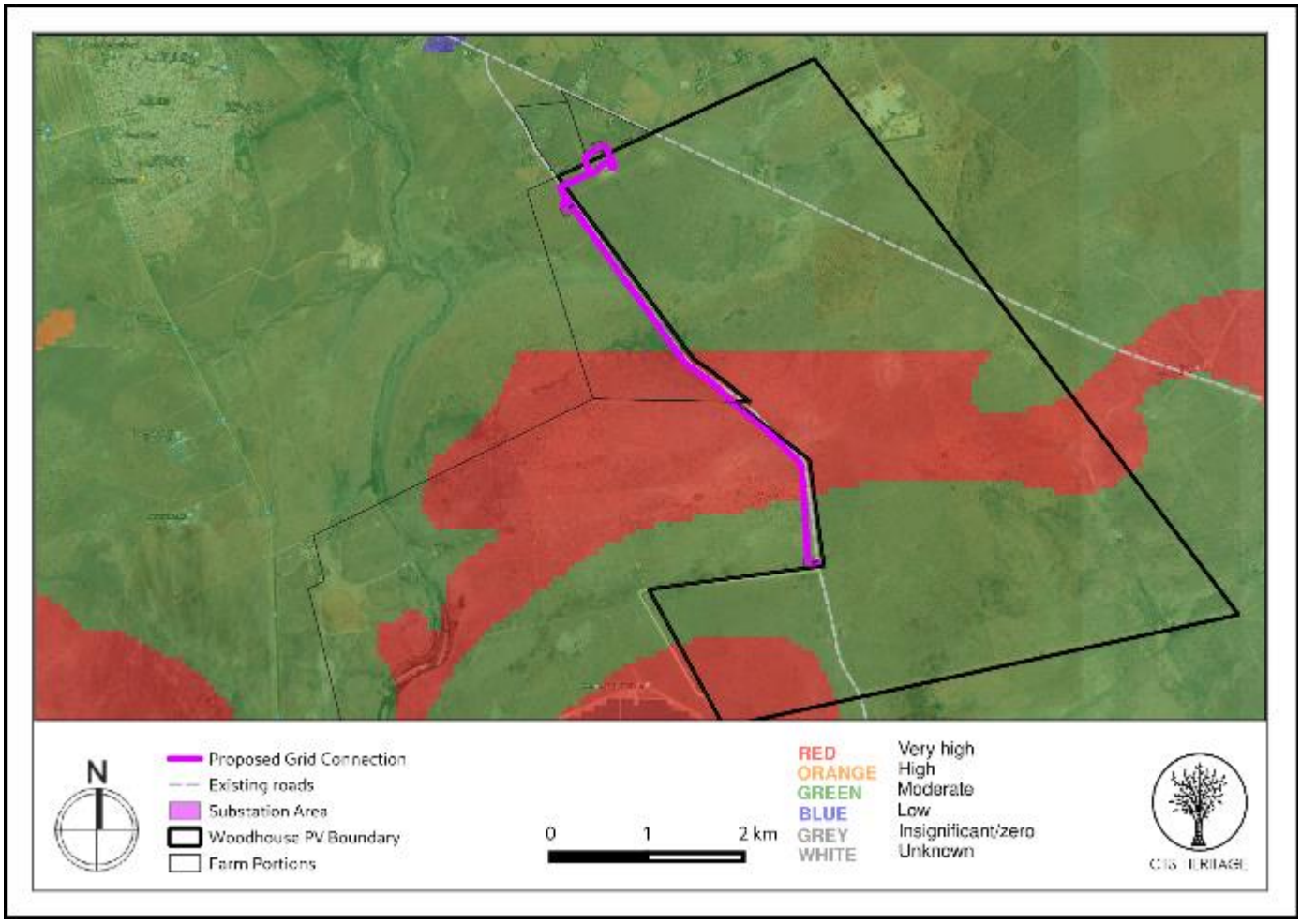

Figure 6.8: Palaeontological sensitivity of the area surrounding the grid connection corridor

6.7. Visual Quality

The majority of the study area is sparsely populated (less than 10 people per km^2) and consists of a landscape of wide-open spaces and very little development, especially to the south. The highest population concentration is at the town of Vryburg and the Huhudi settlement south of the town. The relatively low rainfall has as a consequence that the region has not been transformed by dryland or irrigated agriculture.

Besides the limited cultivation of crops, the study area is largely in a natural state, with cattle and game farming as primary economic activities. The Vryburg region is considered to be the largest beef producing district in South Africa.

Farm residences, or homesteads, dot the landscape at an irregular interval. These homesteads are generally located at great distances from each other (i.e. more than 3km apart). Agricultural holdings are found closer to Vryburg, just north of the R34 arterial road and the Collector Substation Alternative 2.

The N14 national road provides motorised access to the region from Johannesburg, the largest metropolitan area closest to the site (approximately 388km by road). A short section of the R34 arterial road and another 1.5km gravel road provides the quickest access to the proposed development site from the N14.

There are neither designated protected areas within the region nor any identified tourist attractions or destinations within the study area.

In spite of the rural and natural character of the study area, there are a number of overhead power lines in close proximity to the development site, which traverse near the Bophirima and Woodhouse Distribution Substations. These include:

- Mercury - Mookodi 1 400kV
- DeLareyville Municipal - Vryburg 1 88kV
- Mookodi - Vryburg 1 132kV

The photographs (**Table 6.1**) below aid in describing the general environment within the study area and surrounding the proposed grid connection infrastructure.

Table 6.1: Photographs of the general affected environment within which the grid connection corridor is proposed

	
The general environment at the Collector Substation – Alt 1 (Note: Farmhouse in the background).	The Bophirima Substation and existing power line infrastructure

	
The gravel access road to the proposed project site	View of the area proposed for the Woodhouse 2 PV switching substation site immediately north of the Waterloo Solar PV Facility access road.

6.8 Social Context

Table 6.2 provides a baseline summary pf the socio-economic profile of the Dr Ruth Segomotsi Mompati District Municipality and Naledi Local Municipality within which the Woodhouse Solar PVs Grid Connection is located. The data presented in this section has been derived from the 2011 & 2016 Census, and the Dr Ruth Segomotsi Mompati District Municipality and Naledi Local Municipality IDPs and SDFs.[10]

Table 6.2: Baseline description of the socio-economic characteristics of the area within which the Woodhouse Solar PVs Grid Connection is proposed

Location characteristics
» The Dr Ruth Segomotsi Mompati District Municipality (DM) is Category C Municipality. It is the largest district in the province, making up almost half of its geographical area (43 764km^2). » The Naledi Local Municipality is the second largest municipality in the district accounting for 16% of its geographical area (7 030km^2).
Population characteristics
» The population in the Dr Ruth Segomotsi DM is 459 357 the majority of the population in the is between 15 and 64 in age (60.2%). » Population growth in the Dr Ruth Segomotsi DM was -0.22% in 2016. » The population of the Naledi LM is 68 803 , with the majority of the population the being between 15 ad 64 (65.7%). » Population growth in the Naledi LM was 0.68% per annum in 2016
Economic, education and household characteristics

[10] Dr Ruth Segomotsi Mompati District Municipality Integrated Development Plan (2017/2022), Naledi Local Municipality Integrated Development Plan (2019/2020).

- The main economic activities in the Dr Ruth Segomotsi DM are as follows; Community services (33.1%), agriculture (16.1%), finance (16.2%), trade (12.7%), transport (9%), manufacturing (4%), mining (3.2%), construction (3.2%).
- The main economic activities in the Naledi LM is Agriculture and hunting (26.8%)
- The unemployment rate in the Dr Ruth Segomotsi DM is 35.8%
- The unemployment rate in the Naledi LM is 26.1%
- The majority of the population in the Dr Ruth Segomotsi DM aged 20+ has either Matric or no schooling
- The majority of the population in the Naledi LM aged 20+ has either Matic or no schooling
- There are approximately 127 103 households in the Dr Ruth Segomotsi DM, with 89.9% being formal dwellings
- There are approximately 20 692 households in the Naledi LM, with 84.9% being formal dwellings.

Services

- In 2016, 87.6% of households The Dr Ruth Segomotsi DM had electricity for lighting and 14.3% had piped water.
- In 2016, 80.2% of the households in the Naledi LM had electricity for lighting and 39.2% has piped water

CHAPTER 7. ASSESSMENT OF IMPACTS

This chapter serves to assess the significance of the positive and negative environmental impacts (direct and indirect) expected to be associated with the grid connection infrastructure for the Woodhouse Solar PV1 and Woodhouse Solar PV2 facilities.

This assessment has considered the construction and operation of grid connection infrastructure within a 200m wide corridor which is considered necessary associated infrastructure required for the evacuation of electricity from the Woodhouse PV facilities to the national grid. The grid connection infrastructure will comprise of the following key infrastructure and components:

- 132kV switching substation (footprint up to 1ha)
- 132kV power line (within 200m wide corridor)
- Collector substation (footprint up to 1ha)
- 33kV underground cables to connect to the Solar PV energy facilities' substations
- Access roads to substation sites and service tracks (up to 4m wide) where no existing roads are available.

Two alternative collector substation and power line configurations are considered as part of the assessment, details of alternatives are provided in **Chapter 3** of this BA Report.

The full extent of the grid connection corridor (including the associated infrastructure was considered through the specialist assessments undertaken as part of this BA process, as well as within this impact assessment report. The grid connection infrastructure will be appropriately sited within the grid connection corridor through the consideration of the sensitive environmental features present with avoidance of the features considered to be the preferred option.

The development of the grid connection infrastructure for the Woodhouse Solar PVs Grid Connection solution will comprise the following phases:

- ***Pre-Construction and Construction*** – will include pre-construction surveys; site preparation; establishment of access roads (where required), laydown area; construction of foundations involving excavations; the transportation of components/construction equipment to site, manoeuvring and operating vehicles for unloading and installation of equipment; the construction of the substations and power line infrastructure; laying cabling; and commissioning of new equipment and site rehabilitation. The construction phase for the grid connection infrastructure is estimated to be up to 12 months.

- ***Operation*** – will include the operation of the substations and the 132kV power line, which enable the evacuation of electricity from the two solar PV facilities to the national grid. The operation phase of the grid connection infrastructure is expected to be approximately 20 years (with maintenance).

» ***Decommissioning*** – depending on the economic viability of the Woodhouse Solar PV1 and Woodhouse Solar PV2 facilities and Eskom's plans for the collector substations, the length of the operation phase may be extended beyond a 20 year period. This would also require the extension of the operation phase for the grid connection infrastructure. At the end of the project's life, decommissioning will include site preparation, disassembling of the components of the grid connection infrastructure, clearance of the relevant infrastructure at the collector substations and along the power line servitude, and rehabilitation. Note that impacts associated with decommissioning are expected to be similar to those associated with construction activities. Therefore, these impacts are not considered separately within this chapter.

Environmental issues associated with pre-construction, construction and decommissioning activities may include, among others, threats to biodiversity and ecological processes, including habitat alteration and impacts to fauna and avifauna, and impacts to sites of heritage value.

Environmental impacts associated with the operation phase include visual impacts, night-time lighting impacts, habitat alteration and impacts to fauna and avifauna, and potential invasion by alien and invasive plant species.

7.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of BA Reports:

Requirement	Relevant Section
3(h)(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed, (bb) may cause irreplaceable loss of resources, and (cc) can be avoided, managed or mitigated.	The impacts and risk associated with the development of the grid connection infrastructure, including the nature, significance, consequence, extent, duration and probability of the impacts and the degree to which the impact can be reversed and cause an irreplaceable loss of resources are included in sections 7.3.3, 7.4.3, 7.5.3, 7.6.3,
3(h)(vii) positive and negative impacts that the proposed activity will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	The positive and negative impacts associated with the development of the grid connection infrastructure are included in sections 7.3.3, 7.4.3, 7.5.3, 7.6.3,.
3(h)(viii) the possible mitigation measures that could be applied and the level of residual risk.	The mitigation measures that can be applied to the impacts associated with the development of the grid connection infrastructure are included in sections 7.3.3, 7.4.3, 7.5.3, 7.6.3
3(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures,.	A description of all environmental impacts identified for the development of the grid connection infrastructure during the BA process, and the extent to which the impact significance can be reduced through the implementation of the recommended mitigation measures provided by the specialists are included in sections 7.3.3, 7.4.3, 7.5.3, 7.6.3

Requirement	Relevant Section
3(j) an assessment of each identified potentially significant impact and risk, including (i) cumulative impacts, (ii) the nature, significance and consequences of the impact and risk, (iii) the extent and duration of the impact and risk, (iv) the probability of the impact and risk occurring, (v) the degree to which the impact and risk can be reversed, (vi) the degree to which the impact and risk may cause irreplaceable loss of resources and, (vii) the degree to which the impact and risk can be avoided, managed or mitigated.	An assessment of each impact associated with the development of the grid connection infrastructure, including the nature and significance, the extent and duration, the probability, the reversibility, and the potential loss of irreplaceable resources, as well as the degree to which the significance of the impacts can be mitigated are included in sections 7.3.3, 7.4.3, 7.5.3, 7.6.3,
3(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr.	Mitigation measures recommended by the various specialists for the reduction of the impact significance are included in sections 7.3.3, 7.4.3, 7.5.3, 7.6.3,.

7.2. Quantification of Areas of Disturbance within the Grid Connection Corridor

Site-specific impacts associated with the construction and operation of the grid connection infrastructure for the Woodhouse Solar PVs Grid Connection relate to the direct loss of vegetation and species of special concern, disturbance of animals (including avifauna) and loss of habitat, and visual disturbance. In order to assess the impacts associated with the development of the grid connection infrastructure, it is necessary to understand the extent of the affected grid connection corridor and the development footprint of the infrastructure proposed to be developed within the corridor. In this regard, the following is relevant, and indicates that the extent of the area impacted for the infrastructure is not excessive:

- The switching substation for will occupy an area of ~1ha in extent
- The collector substation will occupy an area of ~1ha in extent.
- The 132kV power line will be constructed within a servitude of up to 32m in width over a distance of up to 5.6km (depending on the grid connection configuration). The power line towers are an average distance of 200m apart but can exceed 500m depending on the topography, terrain and sensitive environmental features to be spanned. An area of less than 8m in width would be disturbed (not cleared) underneath the power line across its length for stringing purposes during construction.

7.3. Assessment of impacts on Terrestrial (Flora and Fauna) and Freshwater Ecological Resources

The majority of the terrestrial and freshwater ecological impacts associated with the development would occur during the construction phase as a result of the disturbance associated with site clearance, excavations, the operation of heavy machinery and the presence of construction personnel. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix D** for more details). The terrestrial and freshwater impact assessment assessed the entire extent of the grid connection corridor, as well as the proposed grid connection infrastructure, including the two substations and a 132kV power line.

7.3.1 Results of the Terrestrial and Freshwater Ecological Impact Assessment

Collector Substation Alternatives and Switching Substation

» Terrestrial Ecology:
Two collector substation alternative locations are currently investigated and assessed below. Collector Substation Alternative 1 is located in a slightly less sensitive and transformed habitat (*Open Tarchonanthus camphoratus* Shrubland), however the potential significance of impacts on terrestrial habitats and biodiversity will be very similar for both alternative options, as well as for the switching substation. As such the two collector substation alternatives, as well as the switching substation site will not be assessed separately, but as a single impact assessment applicable to all substation positions.

» Freshwater/Aquatic Ecology:
Both collector substation alternative options as well as the switching substation are located well away from any freshwater/aquatic resource features and will subsequently not have an impact on such resource features.

Grid Power Lines

» Both power line options are very similar in terms of their potential impacts on terrestrial as well as freshwater/aquatic ecosystems and biodiversity (as the alternatives only have a small section which differs between the two alternatives).
» As such the impact assessment conducted below, is applicable to both grid line alternatives.

7.3.2 Description of Terrestrial and Freshwater Ecological impacts

Potential impacts resulting from the proposed project would stem from a variety of different activities and risk factors associated with the site-establishment and operation phases of the project including the following:

» Human presence and uncontrolled access to the site may result in negative impacts on fauna and flora through poaching of fauna and uncontrolled collection of plants for traditional medicine or other purposes.
» Site clearing for site establishment of the construction camp and for the construction of the foundations for the pylons required for the power line.
» Vegetation clearing could impact locally listed plant species. Vegetation clearing would also lead to the loss of vegetation communities and habitats for fauna and potentially the loss of faunal species, habitats, and ecosystems. On a larger and cumulative scale (if numerous and uncontrolled power line developments are allowed to occur in the future) the loss of these vegetation communities and habitats may potentially lead to a change in the conservation status of the affected vegetation type, as well as the ability of this vegetation type and associated features to fulfil its ecological responsibilities (functions).
» Soil compaction and increased erosion risk would occur due to the loss of plant cover and soil disturbance created during the construction phase. This may potentially impact the downstream watercourses and aquatic habitats. These potential impacts may result in a reduction in the buffering capacities of the landscape during extreme weather events.
» Invasion by alien plants may be attributed to excessive disturbance to vegetation, creating a window of opportunity for the establishment of these alien invasive species. Also, regenerative material of alien invasive species may be introduced to the project site by machinery traversing through areas with such plants or materials that may contain regenerative materials of such species.
» The power line will require management and if this is not done effectively, it could impact adjacent intact areas through impacts such as erosion and the invasion of alien plant species.

7.3.3 Impact tables summarising the significance of impacts on ecology during construction and operation (with and without mitigation)

The impacts assessed below apply to the development of the grid infrastructure within the assessed grid connection corridor. Due to the avoidance of sensitive ecological features by the grid connection corridor, the significance of the impacts before and after mitigation is low.

Collector Substation Alternatives and Switching Substation

Impact 1 (Terrestrial Ecology): Potential Impacts on vegetation and listed protected plant species (Construction Phase)

Impact Nature: Vegetation clearing will lead to the loss of current habitat and is an inevitable consequence of this type of activity. The extent of the proposed footprint, is however, small and located within a least concerned ecosystem type. Furthermore, no species of conservation concern were recorded within the proposed footprints. The loss of local vegetation within the footprint is expected to be of relatively minor significance when considered on a broad scale.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (3)	Small (1)
Probability	Highly Probable (4)	Improbable (2)
Significance	**Medium (32)**	**Low (12)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

- Pre-construction environmental induction for all construction staff on-site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, remaining within demarcated construction areas, etc.
- Demarcate all areas to be cleared with construction tape or similar material where practical. However, caution should be exercised to avoid using material that might entangle fauna.
- Contractor's EO to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of the project, when the majority of vegetation clearing is taking place.
- Ensure that laydown areas, construction camps and other temporary use areas are located in areas of low and medium sensitivity and are properly fenced or demarcated as appropriate and practically possible.
- All vehicles to remain within demarcated construction areas and no unnecessary driving in the veld outside these areas should be allowed.
- Regular dust suppression during construction, if deemed necessary, especially along access roads.
- No fires should be allowed on-site.

Residual Impacts

Some residual vegetation loss will result from the development, equivalent to the operational footprint.

Impact 2 (Terrestrial Ecology): *Potential Faunal Impacts (Construction Phase, Decommission Phase and during maintenance – Operation Phase).*

Impact Nature: Disturbance, transformation, and loss of habitat will have a negative effect on resident fauna during construction.
There are fauna residents within the site, and these will be impacted during the construction of the on-site substation. However, faunal diversity and density within the site were very low, and post-mitigation impacts are likely to be Low and of Local significance only.
Increased levels of noise, pollution, disturbance, and human presence during the construction and decommissioning phases may affect the local fauna. Sensitive and shy fauna would move away from the area during these phases and may only move back and inhabit the area post-decommission. Some slow-moving species would not be able to avoid the activities and might be killed.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (3)	Small (1)
Probability	Probable (3)	Improbable (2)
Significance	**Low (24)**	**Low (12)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Noise and disturbance during the construction, decommission and during maintenance phases cannot be avoided but would be transient in nature and with appropriate mitigation; no long-term impacts from the construction phase can be expected.	

Mitigation

- Site access should be controlled and no unauthorised persons should be allowed onto the site.
- Any fauna directly threatened by the associated activities should be removed to a safe location by a suitably qualified person.
- The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated site.
- Fires should not be allowed on site.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- All construction vehicles should adhere to a low speed limit (30km/h) to avoid collisions with susceptible species such as snakes and tortoises.
- Construction vehicles limited to a minimal footprint on site (no movement outside of the earmarked footprint).

Residual Impacts

Due to the nature of this development, there will be a permanent loss of habitat and forage for fauna. However, due to the relatively small footprint of the development and the fact that this area contain a low faunal diversity this potential residual impact can be regarded as low.

Impact 3 (Terrestrial Ecology): *Potential increased erosion risk during construction and decommission.*

Impact Nature: During construction/decommission, there will be a lot of disturbed and loose soil at the site which will render the area vulnerable to erosion. Erosion is one of the greater risk factors associated with the development and it is therefore critically important that proper erosion control structures are built and maintained over the lifespan of the project.

	Without Mitigation	**With Mitigation**
Extent	Local to neighbouring areas (2)	Local (1)
Duration	Medium-term (3)	Short-term (1)

Magnitude	Moderate (6)	Small (1)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (44)**	**Low (9)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

- Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- All bare areas due to the project activities should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.
- An erosion control management plan should be utilised to prevent erosion
- There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased.
- Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities
- Stormwater from the substations and other hard stand areas, must be managed using appropriate channels and swales when located within steep areas.
- Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any stormwater leaving the substation sites.
- Construction of gabions and other stabilisation features to prevent erosion, if deemed necessary.
- Re-instate as much of the eroded area to its pre-disturbed, "natural" geometry (no change in elevation and any banks not to be steepened) where possible.
- Roads and other disturbed areas should be regularly monitored for erosion problems and problem areas should receive follow-up monitoring by the EO to assess the success of the remediation.
- Topsoil must be removed and stored separately from subsoil. Topsoil must be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.

Residual Impacts

The loss of fertile soil and soil capping resulting in areas which cannot fully rehabilitate itself with a good vegetation cover. With appropriate avoidance and mitigation residual impacts will be very low.

Impact 4 (Terrestrial Ecology): *Altered runoff patterns due to rainfall interception by infrastructure and compacted areas resulting in high levels of erosion (Operation Phase)*

Impact Nature: The presence of an extensive area of hardened surface during operation will generate runoff which can pose a significant erosion risk, if not managed. Erosion is one of the greater risk factors associated with this type of development, and it is therefore essential that proper erosion control structures are built and maintained over the lifespan of the project.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Short-term (1)
Magnitude	Minor (2)	Small (1)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (32)**	**Low (9)**
Status	Negative	Negative
Reversibility	Low	High

Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

- Regular monitoring of the site (minimum of twice annually) to identify possible areas of erosion is recommended, particularly after large summer thunder storms have been experienced.
- All bare areas due to the project activities should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.
- Alternatively, soil surfaces where no revegetation seems possible will have to be covered with gravel or small rock fragments to increase porosity of the soil surface, slow down runoff and prevent wind- and water erosion.
- Monitor the area below and around the panels regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation efforts accordingly.
- Due to the nature and larger runoff surfaces, the development area should be adequately landscaped and rehabilitated to contain expected accelerated erosion.
- Runoff may have to be specifically channelled or stormwater adequately controlled to prevent localised rill and gully erosion.
- Any erosion problems observed should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- Roads and other disturbed areas should be regularly monitored for erosion problems and problem areas should receive follow-up monitoring to assess the success of the remediation.

Residual Impacts

The loss of fertile soil and soil capping resulting in areas which cannot fully rehabilitate itself with a good vegetation cover. With appropriate avoidance and mitigation residual impacts will be very low.

Impact 5 (Terrestrial Ecology): *Potential increased alien plant invasion during the construction, operational and decommissioning phase.*

Impact Nature: The disturbed and bare ground that is likely to be present at the site during and after construction would leave the site vulnerable to alien plant invasion for some time if not managed. Furthermore, the National Environmental Management Biodiversity Act (Act No. 10 of 2004), as well as the Conservation of Agricultural Resources Act, (Act No. 43 of 1983) requires that listed alien species are controlled in accordance with the Act.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Short-term (1)
Magnitude	Minor (2)	Small (1)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (32)**	**Low (9)**
Status	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

- A site-specific eradication and management programme for alien invasive plants must be implemented during construction.
- Regular monitoring by the operation and maintenance team for alien plants at the within the power line servitude must occur and could be conducted simultaneously with erosion monitoring.
- When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur and increase to problematic levels.
- Clearing methods must aim to keep disturbance to a minimum.

» No planting or importing any listed invasive alien plant species (all Category 1a, 1b and 2 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.
Residual Impacts If the above recommended mitigation measures are strictly implemented and some re-establishment and rehabilitation of natural vegetation is allowed the residual impact will be very low.

Grid Power Line

Impact 1 (Terrestrial Ecology): Potential Impacts on vegetation and listed protected plant species (Construction Phase).

Impact Nature: Vegetation clearing will lead to the loss of current habitat within the grid connection corridor and is an inevitable consequence of this type of activity. The extent of this grid connection corridor, is however, relatively small and the vegetation types within the affected area have a relatively wide distribution and are regarded as Least Concern.

The most likely consequences include:

- » local loss of habitat (to an extent as a natural ground covering will be maintained where possible);
- » very small and local disturbance to processes maintaining local biodiversity and ecosystem goods and services; and
- » a potential loss of a few local protected species (e.g. *Vachellia erioloba, Boophone disticha*, *Babiana hypogea*).

The development footprints for both options are largely homogenous in terms of habitat types and vegetation cover thus providing for easier and more accurate calculation of potential impacts, more effective recommendations and implementation of management and mitigation measures, and furthermore lowering the impact and beta diversity. The loss of local vegetation within the footprint is expected to be of relatively minor significance when considered on a broad scale.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (4)	Minor (3)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (36)**	**Low (24)**
Status	Negative	Negative
Reversibility	Low	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

- » Pre-construction walk-through of the power line route/corridor to locate protected and species of conservation concern that can be translocated or avoided.
- » Vegetation clearing to commence only after walkthrough has been conducted and necessary permits obtained.
- » Pre-construction environmental induction for all construction staff on-site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, remaining within demarcated construction areas, etc.
- » Demarcate all areas to be cleared with construction tape or similar material where practical. However, caution should be exercised to avoid using material that might entangle fauna.
- » Contractor's EO to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of the project, when the majority of vegetation clearing is taking place.
- » Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.

- Ensure that laydown areas, construction camps and other temporary use areas are located in areas of low and medium sensitivity and are properly fenced or demarcated as appropriate and practically possible.
- All vehicles to remain within demarcated construction areas and no unnecessary driving in the veld outside these areas should be allowed.
- Existing tracks should be used for access wherever possible.
- The morphology and hydrology of the wetland features not be altered by unnecessary excavations, dumping of soil or other waste.
- No fires should be allowed on-site.

Residual Impacts
Some residual vegetation loss will result from the development, equivalent to the operational footprint of the power line.

Impact 2 (Terrestrial Ecology): Potential Faunal Impacts (Construction Phase, Decommission Phase and during maintenance – Operation Phase)

Impact Nature: Disturbance, transformation, and loss of habitat will have a negative effect on resident fauna during construction.
There are fauna residents within the site, and these will be impacted during the construction of the power line. However, faunal diversity and density within the site are low, and post-mitigation impacts are likely to be Low and of Local significance only.
Increased levels of noise, pollution, disturbance, and human presence during the construction phase may affect the local fauna. Sensitive and shy fauna would move away from the area during the construction phase and may move back into the area upon completion of the construction phase. Some slow-moving species (i.e. tortoise & snakes) would not be able to avoid the activities and might be killed.
Faunal diversity and density within the site are low and post-mitigation impacts are likely to be Low and of Local significance only.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Minor (4)	Small (2)
Probability	Highly Probable (4)	Probable (3)
Significance	**Low (28)**	**Low (15)**
Status	Negative	Negative
Reversibility	Moderate	Moderate to High
Irreplaceable loss of resources	Unlikely	Unlikely
Can impacts be mitigated?	Noise and disturbance during the construction, decommission and during maintenance phases cannot be avoided but would be transient in nature and with appropriate mitigation; no long-term impacts from the construction phase can be expected.	

Mitigation
- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises which are often persecuted out of superstition.
- Site access should be controlled and no unauthorised persons should be allowed onto the site.
- Any fauna directly threatened by the associated activities should be removed to a safe location by a suitably qualified person.
- The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated site.
- Fires should not be allowed on site.

» All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. » All construction vehicles should adhere to a low speed limit (30km/h) to avoid collisions with susceptible species such as snakes and tortoises. » Construction vehicles limited to a minimal footprint on site (no movement outside of the earmarked footprint).
Residual Impacts There will be minimal residual impact as the facility will have low operational impacts on fauna, after the construction phase.

Impact 3 (Terrestrial Ecology): Potential increased erosion risk during construction and decommissioning

Impact Nature: During construction/decommissioning, disturbed and loose soil at the site which will render the area vulnerable to erosion. It is important that proper erosion control structures are built and maintained over the lifespan of the project.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Medium-term (3)	Short-term (1)
Magnitude	Moderate (5)	Small (2)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (40)**	**Low (12)**
Status	Negative	Negative
Reversibility	Low	Moderate to High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

- Any erosion problems observed to be associated with the access road and/or hardened/engineered surfaces should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- All bare areas due to the project activities should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.
- An erosion control management plan should be utilised to prevent erosion
- There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased.
- Construction of gabions and other stabilisation features to prevent erosion, if deemed necessary.
- Re-instate as much of the eroded area to its pre-disturbed, "natural" geometry (no change in elevation and any banks not to be steepened) where possible.
- Roads and other disturbed areas should be regularly monitored for erosion problems and problem areas should receive follow-up monitoring by the EO to assess the success of the remediation.
- Topsoil must be removed and stored separately from subsoil. Topsoil must be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.

Residual Impacts

The loss of fertile soil and soil capping resulting in areas which cannot fully rehabilitate itself with a good vegetation cover. With appropriate avoidance and mitigation residual impacts will be very low.

Impact 4 (Terrestrial Ecology): Potential increased alien plant invasion during the construction, operation and decommissioning phase

Impact Nature: The disturbed and bare ground that is likely to be present at the site during and after construction would leave the site vulnerable to alien plant invasion for some time if not managed. Furthermore, the National Environmental Management Biodiversity Act (Act No. 10 of 2004), as well as the Conservation of Agricultural Resources Act, (Act No. 43 of 1983) requires that listed alien species are controlled in accordance with the Act.

	Without Mitigation	With Mitigation
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Short-term (1)
Magnitude	Minor (4)	Small (1)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (44)**	**Low (9)**
Status	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

- A site-specific eradication and management programme for alien invasive plants must be implemented during construction.
- Regular monitoring by the operation and maintenance team for alien plants at the within the power line servitude must occur and could be conducted simultaneously with erosion monitoring.
- When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur and increase to problematic levels.
- Clearing methods must aim to keep disturbance to a minimum.
- No planting or importing any listed invasive alien plant species (all Category 1a, 1b and 2 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.

Residual Impacts

If the above recommended mitigation measures are strictly implemented and some re-establishment and rehabilitation of natural vegetation is allowed the residual impact will be very low.

Impact 5 (Freshwater/Aquatic Ecology): Loss and/or disturbance of wetland and drainage systems during the construction, operation and decommissioning phase

Impact Nature: The physical removal/disturbance of the narrow strips of wetland/drainage zones by pylon construction. This biological impact would however be localised, as a large portion of the remaining catchment would remain intact.

These disturbances will be the greatest during the construction and again in the decommissioning phase as the related disturbances could result in loss and/or damaged vegetation.

	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (4)	Small (2)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (36)**	**Low (21)**
Status	Negative	Negative
Reversibility	Low – Destruction of wetland/drainage systems and associated vegetation will not be remedied easily.	Low – Destruction of wetland/drainage systems and associated vegetation will not be remedied easily.
Irreplaceable loss of resources	Local and potential loss of downstream resources	Unlikely
Can impacts be mitigated?	Yes, to a large degree	

Mitigation

- No pylons may be placed within the delineated wetland/drainage habitats; however, the power line may span these features.

- Use as far as possible the existing roads.
- No activities or movement shall be allowed outside of the approved development footprint.
- It is recommended that the power line should be placed as close as possible to the provincial gravel road and should rather span the small drainage system than the seepage feature.
- The depression wetland is regarded as a No-Go area and no activities may be allowed within this wetland feature.
- No vehicles may refuel within wetland/drainage features.
- With micro adjustments of the pylon positions, it is possible to place pylons outside of any wetland habitats.

Residual Impacts

Possible impact on the remaining catchment due to changes in run-off characteristics in the development site. However, due to the extent of this development this potential residual impact is regarded as low.

Impact 6 (Freshwater/Aquatic Ecology): Impact on localised surface water quality during the construction, operation and decommissioning phase

Impact Nature: During pre-construction, construction, decommissioning and to a limited degree the operation phase (during maintenance), chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet concrete, shutter-oil, etc.) associated with site-clearing machinery and construction activities could be washed downslope via the ephemeral systems.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Long-term (2)	Short-term (2)
Magnitude	Minor (4)	Small (2)
Probability	Probable (3)	Improbable (2)
Significance	Low (24)	Low (10)
Status	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources	Local and potential loss of downstream resources	Unlikely
Can impacts be mitigated?	Yes, to a large degree	

Mitigation

- Implement appropriate measures to ensure strict use and management of all hazardous materials used on site.
- Implement appropriate measures to ensure strict management of potential sources of pollutants (e.g. litter, hydrocarbons from vehicles and machinery, cement during construction and maintenance, etc.)
- Implement appropriate measures to ensure the containment of all contaminated water through careful run-off management on the development site.
- Implement appropriate measures to ensure strict control over the behaviour of construction workers.
- Working protocols incorporating pollution control measures (including approved method statements by the Contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced.
- Place spill kits on site which are operated by trained staff members for the ad hoc remediation of minor chemical and hydrocarbon spillages.
- Due to the low gradient of most of the development footprint any accidental spill or leakage of hazardous or harmful substances can be effectively contained around the source of the spillage. In the case of such an accidental spillage, prompt and effective action is required in order to prevent the spillage form spreading and to successfully rehabilitate the contaminated area.
- Waste should be stored on site in clearly marked containers in a demarcated area.
- All waste material should be removed at the end of every working day to designated waste facilities at the main construction camp/suitable waste disposal facility.
- All waste must be disposed of offsite.
- Appropriate ablution facilities should be provided for construction workers, well outside of the boundaries of any wetland/drainage features.

Residual Impacts

Residual impacts will be negligible after appropriate mitigation.

Impact 7 (Freshwater/Aquatic Ecology): Increase in sedimentation and erosion during the construction, operation and decommissioning phase

Impact Nature: For the construction and decommissioning phases this refers to the alteration in the physical characteristics of freshwater resource features as a result of increased turbidity and sediment deposition, caused by soil erosion and earthworks that are associated with construction activities. Possible ecological consequences associated with this impact may include:

- Deterioration in freshwater ecosystem integrity; and
- Reduction/loss of habitat for aquatic dependent flora & fauna.

This may furthermore, influence water quality downstream.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Very Short (1)
Magnitude	Minor (3)	Small (1)
Probability	Highly Probable (4)	Improbable (2)
Significance	Medium (32)	Low (6)
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	Very limited loss of local resources	No irreplaceable loss of local resources
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

- Use as far as possible the existing roads.
- No activities or movement shall be allowed outside of the approved development footprint.
- It is recommended that the power line should be placed as close as possible to the provincial gravel road and should rather span the small drainage system than the seepage feature.
- The depression wetland is regarded as a No-Go area and no activities may be allowed within this wetland feature.
- Any erosion observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- All bare areas, as a result of the development, should be revegetated with locally occurring species, to bind the soil and limit erosion potential.
- Topsoil should be removed and stored separately and should be re-applied where appropriate as soon as possible, to encourage and facilitate the rapid regeneration of the natural vegetation on cleared areas.
- Where practical, phased development and vegetation clearing should be applied so that cleared areas are not left un-vegetated and vulnerable to erosion for extended periods.
- Construction of gabions and other stabilisation features to prevent erosion if deemed necessary.
- There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased.

Residual Impacts

Due to the extent and nature of the development, residual impacts are unlikely to occur if the recommended mitigation measures are implemented.

Impact 8 (Freshwater/Aquatic Ecology): Impact on freshwater resource systems through the increase in surface runoff on form and function during the operational phase

Impact Nature: The addition of hardened and compacted areas around the pylons. Service roads have the potential to further increase areas of hardening. Increased runoff due to the addition of areas of hard surfaces and could lead to increased erosion risk, potentially reducing or disturbing important/sensitive downstream riparian habitats.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)

Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (4)	Small (1)
Probability	Probable (3)	Improbable (2)
Significance	**Low (27)**	**Low (12)**
Status	Negative	Negative
Reversibility	Low	Low .
Irreplaceable loss of resources	Local loss of resources	Very limited loss of local resources
Can impacts be mitigated?	Yes, to a large extent	
Mitigation » Any erosion observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur. » Construction of gabions and other stabilisation features to prevent erosion if deemed necessary.		
Residual Impacts Altered morphology. Due to the extent and nature of the development this residual impact is unlikely to occur.		

7.3.4 Comparative Assessment of Alternatives

A summary of the assessment of impacts for the grid connection and associated infrastructure alternatives are detailed below and include the identification of the preferred alternative, in terms of the potential impacts on terrestrial (Fauna and Flora) as well as freshwater resource features.

Grid Connection Alternative 1	***Acceptable, and preferred Alternative*** • Switching Substation located medium sensitivity habitat • Collector Substation located in a slightly less sensitive and transformed habitat. • Collector Substation located outside of the boundaries of delineated freshwater resource features. • Grid line able to avoid sensitive features within 200m corridor • Access roads located outside Ecological Support Area
Grid Connection Alternative 2	***Acceptable*** • Switching Substation located medium sensitivity habitat • Collector Substation located outside of the boundaries of delineated freshwater resource features. • Grid line able to avoid sensitive features within 200m corridor. However, greater extent of power line located within an Ecological Support Area (Corridor). • Access roads located inside Ecological Support Area

7.3.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of terrestrial and freshwater ecological impacts of the grid connection infrastructure can be reduced to low. From the outcomes of the study undertaken, the grid connection infrastructure can be developed as impacts will be of low significance. From the outcomes of the study undertaken, it is concluded that the grid connection infrastructure can be developed and impacts on ecology managed by taking the following into consideration:

» No pylons may be placed within the delineated wetland/drainage habitats; however, the power line may span these features.
» No activities or movement shall be allowed outside of the approved development footprint.

» It is recommended that the power line should be placed as close as possible to the provincial gravel road.

7.4. Assessment of Impacts on Avifauna

The significance of the impacts on avifauna expected with the development of the grid connection infrastructure for the Woodhouse Solar PVs Grid Connection has been assessed as medium to low with the implementation of mitigation measures, depending on the impact being considered. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix E** for more details). The avifauna impact assessment assessed the entire extent of the grid connection corridor, as well as the grid connection infrastructure, including the two substations and the 132kV power line.

7.4.1 Results of the Avifauna Impact Assessment

Collector Substation Alternatives and Switching Substation

Both collector Substation alternatives are located in low sensitive avifaunal habitats, while the switching substation is proposed within a slightly more sensitive habitat. However, it is envisaged that the potential impacts on avifauna will be very similar for both Grid Connection Alternatives as well as the Switching Substation, and as such these options will not be assessed separately but within a single impact assessment that will be applicable to both Collector Substation options as well as to the Switching Substation option.

Grid Power Lines

Both power line options very similar in terms of their potential impacts on avifauna. As such the impact assessment conducted below, is applicable to both grid line alternatives.

7.4.2 Description of Avifaunal Impacts

Potential bird impacts associated with distribution power lines include electrocution, collision and disturbances caused during the construction and operation. It is however a common rule that large and heavy-bodied bird species are more at risk of being affected in a negative way when interacting with power lines. These impacts include the following:

Electrocution

Power Line Infrastructure: Electrocution happens when a bird bridges the gap between the live components or a combination of a live and earth component of a power line, thereby creating a short circuit. This happens when a bird, mainly a species with a fairly large wingspan attempts to perch on a pylon or attempts to fly-off a pylon. These larger species will attempt to roost and even breed on the pylon structures if available nesting platforms are a scarce commodity.

Other types of electrocutions happen by means of so-called "birdstreamers". This happens when a bird, especially when taking off, excretes and thereby causing a short-circuit through the fluidity excreta (Van Rooyen & Taylor, 1999).

Substation Infrastructure: Since there is live hardware in the switching and collector substation yards, the potential exists for birds to bridge the gap between a phase and earth resulting in electrocution. The impact of electrocution from substation infrastructure are considered to be of lower of significance once mitigation in the form of bird-friendly structures and bird deterrent measures have been put in place. Species likely to be affected are crows and other non-threatened species with the majority of threatened species avoiding the switching station yard as they are sensitive to disturbances.

Collision

Power Line Infrastructure: Collision with earth wires have probably accounted for most bird-power line interactions in South Africa. In general, the earth wires are much thinner in diameter when compared to the live components, and therefore less visible to approaching birds. Many of the species likely to be affected include heavy, large-bodied terrestrial species such as cranes, storks, flamingos, bustards, korhaans, Secretarybirds and a variety of waterbirds that are not very agile or manoeuvrable once airborne. These species, especially those with the habit of flying with outstretched necks (e.g. most species of storks and flamingos) find it difficult to make a sudden change in direction while flying – resulting in the bird flying into the earth wires.

Habitat destruction and physical disturbance during construction and maintenance

Power Line as well as Switching and Collector Stations: Habitat destruction is not considered to be a major impact since many of the bird species will temporarily vacate the area during the construction phase. It is inevitable that most bird species (including the smaller passerine) will be affected by road construction, the construction of pylons and stringing operations. However, the impact is considered to be more severe within or in close proximity to pans, watercourses and drainage lines, and could displace large-bodied bird species (especially if these are breeding in the proximal vicinity within 100m). Typical species include foraging and breeding large-bodied terrestrial bird taxa.

7.4.3 Impact tables summarising the significance of impacts on avifauna during construction and operation (with and without mitigation)

Collector Substation Alternatives

***Impact 1 (Avifauna):* Loss/Destruction of Avifaunal Habitat (initiated during the construction phase and carried throughout the operational phase)**

Impact Nature: Some habitat destruction and alteration are inevitable, although this is will be limited. The construction and operation of the collector substation and switching station will have a very slight impact on foraging, breeding and roosting ecology of avian species within the area through modification of the local habitat. No Red Data species were recorded within the immediate area of the proposed substation locations, as well as within the surrounding area. Furthermore, the limited displacement that may occur, will only be from a very restricted area. The impact on smaller, non-Red Data species that are potentially breeding in the area will be local and very restricted in extent, and will not have a significant effect on regional or national populations.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (3)	Small (1)

Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (32)**	**Low (18)**
Status	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources	Only very slight loss of resources	Only very slight loss of resources
Can impacts be mitigated?	Yes, to a large extent.	

Mitigation

- The temporal and spatial footprint of the development should be kept to a minimum.
- The boundaries of the development footprint are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.
- Open fires are strictly prohibited and only allowed at designated areas.
- Provide adequate briefing for site personnel on the possible important (Red Data) species occurring and/or nesting in the area and the procedures to be followed in this regard (for example notification of ECO and avoidance of area until appropriate recommendations have been provided by a specialist).
- The above measures must be covered in a site specific EMPr and monitored by an ECO.

Residual Impacts

Some residual habitat loss will result from the development, equivalent to the operational footprint of the power line.

Impact 2 (Avifauna): Disturbance of avifauna during the construction, operational (maintenance activities) and decommissioning phase.

Impact Nature: Disturbance, transformation, and loss of habitat will have a negative effect on resident avifauna during construction.

Species sensitive to disturbance include ground-nesting species potentially resident within the development footprint. Disturbance can also influence the community structure of avifauna within close proximity to the development as certain species will be displaced and forced to find alternative territories. Disturbance could have a negative impact on the breeding activities of various species, particularly if this occurs during a sensitive period in the breeding cycle.

Increased levels of noise, pollution, disturbance, and human presence during the construction phase and periods of maintenance (operational phase) may affect the local avifauna. Sensitive and shy avifauna would move away from the area during these periods and may move back into the area upon completion of the construction phase and after maintenance activities.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (5)	Minor (3)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (32)**	**Low (18)**
Status	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources	Only very slight loss of resources	Only very slight loss of resources
Can impacts be mitigated?	Yes, to a large extent.	

Mitigation

- Strict control must be maintained over all activities during construction and maintenance, in line with an approved EMPr.
- During construction, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified and were deemed necessary an appropriate buffer should be placed around the nests and/or roosting areas. If uncertain on the size of such buffer the Environmental Officer (EO) may contact an avifaunal specialist for advice.

» The construction equipment camps must be as close to the site as possible and within disturbed areas as far as possible. » Contractors and working staff must remain within the development footprint and movement outside these areas especially into avian micro-habitats must be restricted. » Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads associated with the project during the construction phase.	
Residual Impacts	There will be minimal residual impact as the facility will have low operational impacts on avifauna, after the construction phase.

Impact 3 (Avifauna): Electrocution of birds on substation infrastructure

Impact Nature: The potential exists for birds to bridge the gap between a phase and earth resulting in electrocution. The impact of electrocution from the infrastructure are considered to be much lower of significance once mitigation in the form of bird friendly structures and bird deterrent measures have been put in place. Species likely to be affected are crows and other non-threatened species with the majority of threatened species avoiding these areas as they are sensitive to disturbances.		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (4)	Small (1)
Probability	Probable (3)	Improbable (2)
Significance	Low (27)	Low (12)
Status	Negative	Negative
Reversibility	Low (birds will be injured or killed)	Low (birds will be injured or killed)
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes,	
Mitigation » All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting, 2002). » Installation of artificial bird space perches and nesting platforms, at a safe distance from energised components (Goudie, 2006; Prinsen et al., 2012).		
Residual Impacts The substation associated infrastructure will be within the area over a long period of time, if not permanently. However, if the facilities and infrastructure are removed the impacts associated (avian injuries and mortalities) will cease		

Grid Power Lines

***Impact 1 (Avifauna):* Loss/Destruction of Avifaunal Habitat (initiated during the construction phase and carried throughout the operational phase)**

Impact Nature: During the construction of the power line, some habitat destruction and alteration will occur, although this is will be limited. These activities may have a very slight impact on foraging, breeding and roosting ecology of avian species within the area through modification of habitat. No Red Data species were recorded within the immediate, as well as within the surrounding area. Furthermore, the limited displacement that may occur, will only be from a very restricted area. The impact on smaller, non-Red Data species that are potentially breeding in the area will be local and very restricted in extent, and will not have a significant effect on regional or national populations.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)

Magnitude	Minor (3)	Small (2)
Probability	Definite (5)	Probable (3)
Significance	**Medium (40)**	**Low (21)**
Status	Negative	Negative
Reversibility	Moderate	High
Irreplaceable loss of resources	Only very slight loss of resources	Only very slight loss of resources
Can impacts be mitigated?	Yes, impacts mostly limited to construction phase:	

Mitigation

- The temporal and spatial footprint of the development should be kept to a minimum.
- The boundaries of the development footprint are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.
- Open fires are strictly prohibited and only allowed at designated areas.
- Provide adequate briefing for site personnel on the possible important (Red Data) species occurring and/or nesting in the area and the procedures to be followed in this regard (for example notification of ECO and avoidance of area until appropriate recommendations have been provided by a specialist).
- The above measures must be covered in a site specific EMPr and monitored by an ECO.

Residual Impacts

Some residual habitat loss will result from the development, equivalent to the operational footprint of the power line.

Impact 2 (Avifauna): Disturbance of avifauna during the construction, operation (maintenance activities) and decommissioning phase

Impact Nature:

Disturbance, transformation, and loss of habitat will have a negative effect on resident avifauna during construction. Species sensitive to disturbance include ground-nesting species resident within the development footprint. Disturbance can also influence the community structure of avifauna within close proximity to the development as certain species will be displaced and forced to find alternative territories.

Disturbance could have a negative impact on the breeding activities of various species, particularly if this occurs during a sensitive period in the breeding cycle.

Increased levels of noise, pollution, disturbance, and human presence during the construction phase may affect the local avifauna. Sensitive and shy avifauna would move away from the area during the construction phase and may move back into the area upon completion of the construction phase.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (5)	Minor (4)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (32)**	**Low (21)**
Status	Negative	Negative
Reversibility	High	Medium
Irreplaceable loss of resources	Minimal	Minimal
Can impacts be mitigated?	Impacts can be mitigated to a large extent. Noise and disturbance at the site during construction and maintenance are largely unavoidable.	

Mitigation

- Strict control must be maintained over all activities during construction, in line with an approved construction EMPr.
- During construction, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified and were deemed necessary an appropriate buffer should be placed around the nests and/or roosting areas. If uncertain on the size of such buffer the Environmental Officer (EO) may contact an avifaunal specialist for advice.
- The construction equipment camps must be as close to the site as possible and within disturbed areas as far as possible.
- Contractors and working staff must remain within the development footprint and movement outside these areas especially into avian micro-habitats must be restricted.
- Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads associated with the project during the construction phase.
- Breeding, egg laying and incubation occur typically between October and February for most of the sensitive ground nesting avifaunal species. During these months' disturbances within natural and near-natural habitats should be limited as far as possible.

Residual Impacts

There will be minimal residual impact as the facility will have low operational impacts on avifauna, after the construction phase.

Impact 3 (Avifauna): Electrocution of birds due to overhead power lines

Impact Nature:

Electrocution of birds on associated overhead power lines is an important cause of mortality for a variety of large bird species particularly storks, cranes and raptors in South Africa (Van Rooyen & Ledger, 1999). Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (van Rooyen 2004; Lehman *et al*., 2007).

The impact assessment found the impact of electrocution to be of moderate significance before mitigation, and low significance after the mitigation in the form of bird friendly structures.

	Without Mitigation	**With Mitigation**
Extent	Larger Surroundings (3)	Local (2)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	Medium (39)	Low (16)
Status	Negative	Negative
Reversibility	Low	Medium
Irreplaceable loss of resources	Yes, owing to the potential loss of critically endangered or endangered bird species	Low potential for irreplaceable loss of resources
Can impacts be mitigated?	Mitigation is very difficult to prescribe at this stage. It is suggested that the impact be monitored by the operations environmental manager and should it be found to be a significant impact a suitably qualified avifaunal specialist be consulted to recommend suitable mitigation.	

Mitigation

- Position electrical infrastructure in close proximity to existing infrastructure (e.g. existing roads and power lines).
- A "Bird Friendly" structure, with a bird perch (as per standard Eskom guidelines) must be used for the tower structures.
- All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting, 2002).
- Installation of artificial bird space perches and nesting platforms should be installed, at a safe distance from energised components (Goudie, 2006; Prinsen et al., 2012).
- Line inspections should be ongoing for the operational life of the line.

Residual Impacts Direct mortality is possible and may still happen irrespective of applied mitigation measures. The residual impacts should subsequently be regarded as medium.

Impact 4 (Avifauna): Collisions of birds with overhead power line

Impact Nature: Collisions are the biggest single threat posed by transmission power lines to birds in Southern Africa (van Rooyen, 2004). Avian species most susceptible and impacted upon are bustards, storks and cranes (especially bustards which have been confirmed are at risk within the project site). These species are heavy-bodied birds with limited manoeuvrability (as a result of high wing loading), which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines (Van Rooyen 2004, Anderson 2001). Many of the collision sensitive species are considered threatened in Southern Africa. The Red Data species that are vulnerable to power line collisions are generally long living, slow reproducing species. Furthermore, various species require specific conditions for breeding, resulting in very few successful breeding attempts and breeding might be restricted to very small areas. Consistent high adult mortality over an extensive period could have a serious long-term effect on the population.		
	Without Mitigation	**With Mitigation**
Extent	Larger Surroundings (3)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Highly Probable (4)	Probable (3)
Significance	Moderate (52)	Low (27)
Status	Negative	Negative
Reversibility	Low (birds will be injured or killed)	Low (birds will be injured or killed)
Irreplaceable loss of resources	Medium	Low
Can impacts be mitigated?	Yes, to a large extent.	
Mitigation » Construction of the power line in close proximity to the provincial dirt road and existing lines will reduce the cumulative impacts and collision risk. » All relevant perching surfaces must be fitted with bird guards and perch guards as deterrents (Hunting, 2002). » Mark sections of line in high sensitivity areas with anti-collision marking devices (diurnal and nocturnal diverters) to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should be spaced 10m apart. » These line marking devices include spiral vibration dampers, strips, Bird Flight Diverters, bird flappers, aerial marker spheres, ribbons, tapes, flags and aviation balls (Prinsen et al., 2012). » It is proposed that sections of the line in close proximity wetlands and drainage systems be fitted with "Double Loop Bird Flight Diverters" (BFDs). » The power line should, as far as possible, be placed parallel to existing power lines or other linear infrastructure such as roads, as this will also greatly increase the visibility of the overhead cables		
Residual Impacts Low. The power line will be within the area over a long period of time if not permanent. However, if the power line is removed the impacts associated (avian mortalities) will cease.		

7.4.4 Comparative Assessment of Alternatives

A summary of the assessment of impacts for the grid connection and associated infrastructure alternatives are detailed below and include the identification of the preferred alternative, in terms of the potential impacts on avifauna features.

Grid Connection	***Acceptable, and preferred Alternative*** • Switching Substation located medium sensitivity avifauna habitat • Collector Substation located in a slightly less sensitive and transformed habitat.

Alternative 1	• Collector Substation located outside of the boundaries of delineated freshwater resource features. • Grid line able to avoid sensitive features within 200m corridor • Access roads located outside Ecological Support Area
Grid Connection Alternative 2	***Acceptable*** • Switching Substation located medium sensitivity avifauna habitat • Collector Substation located outside of the boundaries of delineated freshwater resource features. • Grid line able to avoid sensitive features within 200m corridor. *Greater extent of power line located within an Ecological Support Area (Corridor).* • Access roads located inside Ecological Support Area

7.4.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors, and operational staff, the significance of avifauna impacts associated with the grid connection infrastructure for the Woodhouse Solar Grid PVs Connection can be reduced low.

From the outcomes of the study undertaken, it is concluded that the grid connection infrastructure can be developed and impacts on avifauna managed by taking the following into consideration:

- » Apply bird deterrent devices to the power line and make use of "bird-friendly" pylon structures.
- » Consolidate infrastructure to areas where existing impacts occur (e.g. placing the proposed power line alongside existing power lines and roads).
- » The development footprint of the various individual facilities must be kept as small as possible and sensitive habitats must be avoided

7.5. Assessment of Impacts on Heritage Resources

Negative impacts on heritage resources will be due to loss during construction activities during the operation of the grid connection infrastructure. Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix E** for further details). The heritage impact assessment assessed the full extent of the grid connection corridor, as well as the grid connection infrastructure, including the two alternative collector substations.

7.5.1 Results of the Heritage Impact Assessment (including archaeology, palaeontology and cultural landscape)

Several ex-situ archaeological resources have been identified within the grid connection corridor, however, the potential for finding a dateable in-situ archaeological horizon based on current surface observations appears to be low. The archaeological resources identified have scientifically Low-significance and are graded IIIC. However, as these resources are located within the proposed grid connection corridor it is likely that these resources will be negatively impacted by the proposed development. Furthermore, it is possible that additional archaeological resources are present below the ground surface which may be impacted by the proposed development.

No built infrastructure or structures were identified within the proposed development area for the grid connection corridor. In addition, the landscape in which the grid connection infrastructure is proposed, is

not pristine and is already anticipated to be dominated by energy-related infrastructure. As such, no negative impact to a sensitive cultural landscape is anticipated.

Regarding palaeontological resources, as per Becker (2016), "Although trace fossils and plants could be present in the Dwyka Group the likelihood of significant fossil heritage in the Vryburg area is considered to be low. The southern portion of the development footprint consists of the Vryburg Formation, which is considered as unfossiliferous in this area. Therefore, there are no areas located within the development footprint considered as sensitive."

7.5.2 Description of the Heritage Impacts

Impacts to archaeological and heritage resources are expected to occur during construction phase of the project most likely during foundation excavations. However, with the implementation of mitigation measures are proposed in the section below, the impact to these resources is expected to be of Low significance. There are no fatal flaws expected to occur with regards to archaeological resources.

No impact to significant palaeontological heritage is anticipated, and the impact to paleontological resources is expected be of Low significance with and without the implementation of mitigation measures. It is recommended that no additional specialist palaeontological assessment is required.

7.5.3 Impact tables summarising the significance of impacts on heritage related to the grid connection infrastructure during construction and operation (with and without mitigation)

Impacts to Archaeology Resources

Impact Nature: Nine archaeological sites of low scientific significance (grade IIIC) were identified within the development corridor for the overhead power line		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (10)	Low (4)
Probability	High (5)	Low (1)
Significance	**High (80)**	**Low (10)**
Status (positive or negative)	Negative	Neutral
Reversibility	Irreversible	Irreversible
Irreplaceable loss of resources?	Likely	Not likely
Can impacts be mitigated?	Yes	
Mitigation: » The placement of the pylon footings must be carefully considered in order to avoid impact to the sites WH005, WH008, WH007, WH001, WH003, WH002. » Should any buried archaeological resources or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The South African Heritage Resources Agency (SAHRA) must be contacted immediately in order to determine an appropriate way forward		
Residual Impacts: None		

Impacts to Palaeontological Resources

Impact Nature: According to the SAHRIS Palaeosensitivity Map, the area proposed for development of the gird connection corridor is underlain by sediments that have moderate and high palaeontological sensitivity.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Low (4)
Probability	Low (1)	Low (1)
Significance	**Low (14)**	**Low (10)**
Status (positive or negative)	Negative	Negative
Reversibility	Irreversible	Irreversible
Irreplaceable loss of resources?	Possible	Not likely
Can impacts be mitigated?	Yes	
Mitigation: A Fossil Chance Find protocol must be implemented for any potential discoveries during construction.		
Residual Impacts: None		

7.5.4 Comparative Assessment of Alternatives

A summary of the assessment of impacts for the grid connection and associated infrastructure alternatives are detailed below and include the identification of the preferred alternative, in terms of the potential impacts on heritage resources.

Grid Connection Alternative 1	***Acceptable, and preferred Alternative*** • Switching station avoids low sensitivity heritage features within 200m corridor • Collector Substation avoids low sensitivity heritage features within 200m corridor • Grid line able to avoid low sensitivity heritage features within 200m corridor • Access road avoids low sensitivity heritage features within 200m corridor
Grid Connection Alternative 2	***Acceptable*** • Switching station avoids low sensitivity heritage features within 200m corridor • Collector Substation avoids low sensitivity heritage features within 200m corridor • Grid line able to avoid low sensitivity heritage features within 200m corridor • Access road avoids low sensitivity heritage features within 200m corridor

7.5.5 Implications for Project Implementation

With the implementation of mitigation measures by the developer, contractors and operation staff, the significance of impacts of the grid connection infrastructure will be low. From the outcomes of the studies undertaken, it is concluded that the grid connection infrastructure can be developed and impacts on heritage managed by taking the following into consideration:

» The placement of pylon footings must be carefully considered in order to avoid impact to identified low significance heritage sites.
» A chance finds procedure must be implemented for the rescuing of any fossils discovered during construction excavations.
» If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

7.6. Assessment of Visual Impacts

Potential impacts and the relative significance of the impacts are summarised below (refer to **Appendix I** for further details). The visual impact assessment assessed the entire extent of the grid connection corridor, as well as the grid connection infrastructure for the both the alternative grid connection configurations.

7.6.1 Results of the Visual Impact Assessment

The combined results of the visual exposure, viewer incidence/perception and visual distance of the proposed grid connection infrastructure culminate in a visual impact index. The visual impact index and potentially affected sensitive visual receptors for the proposed grid connection infrastructure is indicated in **Figure 7.1.** In general, there are only a limited number of receptor sites within close proximity (0.5 – 1.5km) to the proposed project infrastructure. These are:

- A short section of the R34 arterial road
- The secondary road (Amalia Road) traversing adjacent to the proposed power line
- Residents of the southern section of the Bernauw Agricultural Holdings
- The two unnamed residences north and north-west of the Collector Substation alternatives
- The Georgia homestead

The magnitude of the potential visual impact is expected to range from moderate to high.

Regarding the preferred grid connection configuration, the proposed Collector Substation Alternative 2 is located north directly adjacent to the Bophirima Substation and associated power lines. It is expected that the existing visual disturbance at this site will largely absorb the potential visual exposure of the proposed substation i.e. the visual amenity of this site has already been compromised. The Collector Substation Alternative 1 will effectively be a "greenfields" site, with no existing structures or visual disturbances. It will further encroach on the secondary road and the Georgia homestead. To this end, the Grid Connection Alternative 2 is preferred from a visual impact perspective**.** However, Grid Connection Alternative remains acceptable from a visual perspective.

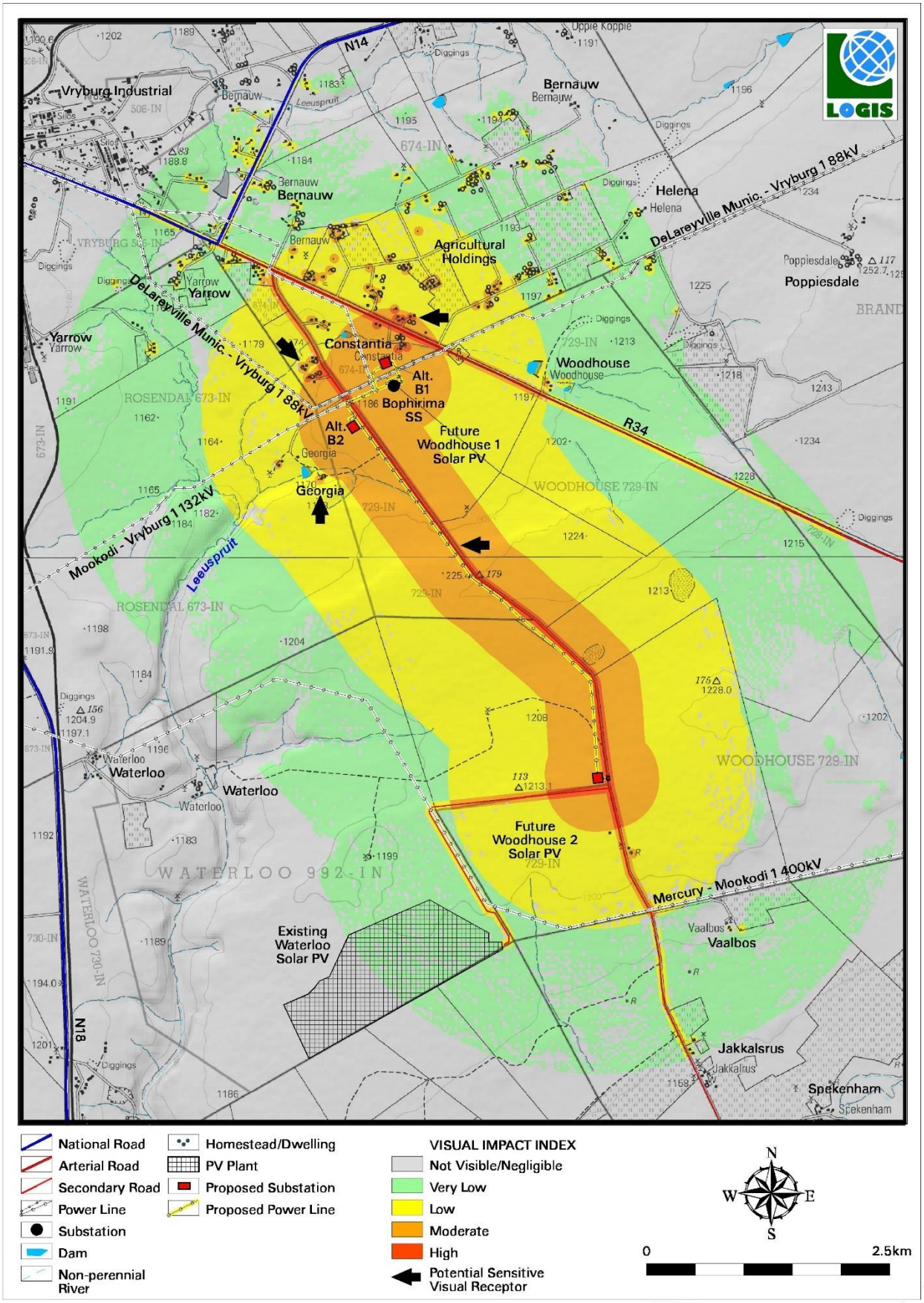

Figure 7.1: Visual impact index and potentially affected sensitive visual receptors.

7.6.2 Description of the Visual Impacts

The primary visual impacts of the proposed grid connection infrastructure for the Woodhouse Solar 1 and 2 PV projects are assessed in the section below. For the purposes of the assessment the proposed project alternatives are grouped accordingly:

- Switching Substation
- Collector Substation and power line Alternative 2 (Grid Connection configuration Alternative 2)
- Collector Substation and power line Alternative 1(Grid Connection configuration Alternative 1)

Visual impacts will occur during the construction and operation phases of the Woodhouse Solar PVs Grid Connection. The following potential visual impacts are assessed for the development of the grid connection infrastructure.

- During construction, there may be an increase in heavy vehicles utilising the roads to the power line and substation sites that may cause, at the very least, a visual nuisance to other road users and landowners in the area. Construction activities may potentially result in a low temporary visual impact both before and after mitigation.

- The configuration of Grid Connection Alternative 2 is expected to have a low visual impact on observers within a 1.5km radius of the grid connection infrastructure. The visual impact of the substation will largely be absorbed by the presence of the existing Bophirima Substation and power lines. The Collector Substation Alternative 1 and power line (preferred) may have visual impacts of moderate significance as this alternative will introduce an additional visual intrusion (i.e. the substation west of the road) on observers travelling along the secondary road or residing at the Georgia homestead. The Switching Substation will similarly be placed west of the road, thereby introducing additional visual clutter at this location, potentially resulting in an impact of moderate significance.

- Potential visual impact on sensitive visual receptors within the region (1.5 – 3km radius) during the operation of the grid connection infrastructure. It is however expected that all grid connection infrastructure will have a low visual impact on observers traveling along the roads and residents of homesteads within a 1.5 - 3km radius of the infrastructure.

- The anticipated visual impact of the proposed grid connection infrastructure on the regional visual quality (i.e. beyond 3km of the proposed infrastructure), and by implication, on the sense of place, is generally expected to be of low significance.

7.6.3 Impact table summarising the significance of visual impacts during construction and operation (with and without mitigation)

Construction and Operation Phase Impacts

Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed grid connection infrastructure.

Nature of Impact: Visual impact of construction activities on sensitive visual receptors in close proximity to the grid connection infrastructure.			
	Grid Connection configuration Alternative 2	***Grid Connection configuration Alternative 1***	***Switching Substation***
Extent	Local **(2)**	Local **(2)**	Local **(2)**
Duration	Short term **(2)**	Short term **(2)**	Short term **(2)**
Magnitude	Low **(4)**	Moderate **(6)**	Moderate **(6)**
Probability	Improbable **(2)**	Improbable **(2)**	Improbable **(2)**
Significance	Low **(16)**	Low **(20)**	Low **(20)**
Status (positive or negative)	Negative	Negative	Negative
Reversibility	Reversible	Reversible	Reversible
Irreplaceable loss of resources?	No	No	No
Can impacts be mitigated?	Yes		

Mitigation:

Planning:

» Retain and maintain natural vegetation immediately adjacent to the development footprint/servitude.

Construction:

» Ensure that vegetation is not unnecessarily removed during the construction phase.
» Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.
» Restrict the activities and movement of construction workers and vehicles to the immediate construction area and existing access roads.
» Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities.
» Reduce and control construction dust using appropriate and effective dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
» Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.
» Rehabilitate all disturbed areas immediately after the completion of construction works.

Residual impacts:

None, provided rehabilitation works are carried out as specified.

Visual impact on observers in close proximity to the proposed grid connection infrastructure.

Nature of Impact: Visual impact on observers travelling along the roads and residents at homesteads in close proximity to the power line structures			
	Grid Connection Configuration Alternative 2	***Grid Connection Configuration Alternative 1***	***Switching Substation***
Extent	Local **(2)**	Local **(2)**	Local **(2)**
Duration	Long term **(4)**	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	High **(8)**	High **(8)**
Probability	Improbable **(2)**	Probable **(3)**	Probable **(3)**
Significance	Low **(28)**	Moderate **(42)**	Moderate **(42)**
Status (positive, neutral or negative)	Negative	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No	No
Can impacts be mitigated?	No		

Mitigation / Management: Planning: » Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint. Operations: » Maintain the general appearance of the infrastructure. Decommissioning: » Remove infrastructure not required for the post-decommissioning use. » Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.
Residual impacts: The visual impact will be removed after decommissioning, provided the power line infrastructure is removed. Failing this, the visual impact will remain.

Visual impact of the proposed grid connection infrastructure within the region.

Nature of Impact: Visual impact on observers travelling along the roads and residents at homesteads within a 1.5 – 3km radius of the grid connection infrastructure.			
	Collector Substation Alternative 2	***Collector Substation Alternative 1***	***Switching Substation***
Extent	Regional **(3)**	Regional **(3)**	Regional **(3)**
Duration	Long term **(4)**	Long term **(4)**	Long term **(4)**
Magnitude	Low **(4)**	Low **(4)**	Low **(4)**
Probability	Improbable **(2)**	Improbable **(2)**	Improbable **(2)**
Significance	Low **(22)**	Low **(22)**	Low **(22)**
Status (positive, neutral or negative)	Negative	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No	No
Can impacts be mitigated?	No		
Mitigation / Management: Planning: » Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. Operations: » Maintain the general appearance of the servitude as a whole. Decommissioning: » Remove infrastructure not required for the post-decommissioning use. » Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.			
Residual impacts: The visual impact will be removed after decommissioning, provided that the grid connection infrastructure is removed. Failing this, the visual impact will remain.			

The potential impact on the sense of place of the region.

Nature of Impact: The potential impact of the development of the grid connection infrastructure on the sense of place of the region.			
	Grid Connection configuration Alternative 2	***Grid Connection Configuration Alternative 1***	***Switching Substation***
Extent	Regional **(3)**	Regional **(3)**	Regional **(3)**
Duration	Long term **(4)**	Long term **(4)**	Long term **(4)**
Magnitude	Minor **(2)**	Low **(4)**	Low **(4)**
Probability	Improbable **(2)**	Improbable **(2)**	Improbable **(2)**
Significance	Low **(18)**	Low **(22)**	Low **(22)**

Status (positive, neutral or negative)	Negative	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented		
Generic best practise mitigation/management measures: Planning: » Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. Operations: » Maintain the general appearance of the servitude as a whole. Decommissioning: » Remove infrastructure not required for the post-decommissioning use. » Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.			
Residual impacts: The visual impact will be removed after decommissioning, provided the grid connection infrastructure is removed. Failing this, the visual impact will remain.			

7.6.4 Comparative Assessment of Alternatives

A summary of the assessment of impacts for the grid connection and associated infrastructure alternatives are detailed below and include the identification of the preferred alternative, in terms of the potential visual impacts.

Grid Connection Alternative 1	***Acceptable*** • Switching Substation no exposed homesteads however, higher visual exposure along Amalia Main Road • Collector Substation no existing structures or visual disturbances • Grid line adjacent to existing Amalia Road • Access Road no existing structures or visual disturbances
Grid Connection Alternative 2	***Preferred & Acceptable*** • Switching Substation no exposed homesteads however, higher visual exposure along Amalia Main Road • Collector Substation located adjacent of Bophirima Substation which is expected to absorb visual exposure. • Grid line adjacent to existing Amalia Road • Access Road located exiting within area of existing structures or visual disturbances

7.6.5 Implications for Project Implementation

The primary visual impact, namely the appearance of the grid connection infrastructure within the landscape is not possible to mitigate. Overall, the significance of the visual impacts is expected to be low as a result of the generally undeveloped character of the landscape. No impacts of high significance are expected to occur.

Both of the Grid Connection Alternatives are considered acceptable from a visual impact perspective. However, the Grid Connection Alternative 2 consistently scored lower impact significance ratings than the Grid Connection Alternative 1, and is therefore the preferred grid connection configuration alternative from a visual impact perspective.

Overall, the primary visual impact, namely the appearance of the grid connection infrastructure is not possible to mitigate. The functional design of the structures cannot be changed in order to reduce visual impacts. The following mitigation is, however, possible:

- Retain/re-establish and maintain natural vegetation in all areas immediately adjacent to the development footprint/servitude.
- Mitigation of visual impacts associated with the construction phase, albeit temporary, entails proper planning, management and rehabilitation of the construction site.
- During operation, the maintenance of the grid connection infrastructure will ensure that the infrastructure does not degrade, therefore aggravating visual impact.
- Roads must be maintained to forego erosion and to suppress dust, and rehabilitated areas must be monitored for rehabilitation failure. Remedial actions must be implemented as a when required.
- Once the grid connection infrastructure has exhausted its life span, all associated infrastructure not required for the post rehabilitation use of the site/servitude should be removed and all disturbed areas appropriately rehabilitated. An ecologist should be consulted to give input into rehabilitation specifications.
- All rehabilitated areas should be monitored for at least a year following decommissioning, and remedial actions implemented as and when required.

7.7. Assessment of the 'Do Nothing' Alternative

The 'do-nothing' alternative (i.e. no-go alternative) is the option of not constructing the consolidated grid connection infrastructure for the Woodhouse Solar PV 1 and PV2 facilities. Should this alternative be selected, there would be no environmental impacts within the grid connection corridor due to the construction and operation activities of grid connection infrastructure. The implementation of the 'do-nothing' alternative will result in the duplication of grid connection infrastructure to evacuate power from (Woodhouse Solar PV1 and PV2).

Furthermore, from a regional perspective, the 'do-nothing' alternative is not preferred as the optimal evacuation of power from renewable energy facilities will not be realised which may be a perceived loss of benefits for the regional area.

From the specialist studies undertaken, no environmental fatal flaws were identified to be associated with the development of the grid connection infrastructure. All impacts associated with the project can be mitigated to acceptable levels. If the grid connection infrastructure is not developed the following positive impacts will not be realised, which are also associated with the Woodhouse Solar PV1 and PV2 developments:

- Job creation from the construction and operation phases.
- Meeting of energy generation mix in a most economic and rapid manner.
- Provision of clean, renewable energy in an area where it is optimally available.

As detailed above, the 'do-nothing' alternative will result in lost opportunities in terms of positive impacts as well as the loss of the opportunity to develop consolidated grid connection infrastructure to evacuate power from two authorised PV projects (Woodhouse Solar PV1 and PV2), which reduces the amount of potential grid connection infrastructure in the surrounding area. The negative impacts associated with the 'do nothing' alternative are considered to outweigh the positive impacts of this alternative. The 'do nothing' alternative is, therefore, not preferred and not proposed (or recommended) to be implemented for the Woodhouse Solar PVs Grid connection.

CHAPTER 8. ASSESSMENT OF POTENTIAL CUMULATIVE IMPACTS

As identified and assessed in Chapter 8, the development of the grid connection infrastructure may have effects (positive and negative) on natural resources, the social environment and on the people living in a project area. The preceding impact assessment chapter has reported on the assessment of the impacts associated with the grid connection infrastructure for the Woodhouse Solar PV1 and PV2 facilities largely in isolation (from other similar developments).

This chapter assesses the potential for the impacts associated with the grid connection infrastructure to become more significant when considered in combination with the other known or planned projects within the area.

8.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of BA Reports:

Requirement	Relevant Section
3(j)(i) an assessment of each identified potentially significant impact and risk, including cumulative impacts.	The cumulative impacts associated with the development of the Woodhouse Solar PVs Grid Connection are included and assessed within this chapter.

8.2. Approach taken to Assess Cumulative Impacts

The cumulative impacts of the proposed Woodhouse Solar PVs Grid Connection have been assessed through the consideration of existing grid infrastructure associated with the national grid are also considered as part of this cumulative impact assessment.

The cumulative impacts that have the potential to be compounded through the development of the grid connection infrastructure in proximity to other similar developments include impacts such as those listed below. The role of the cumulative assessment is to identify if such impacts are relevant to the grid connection infrastructure, as well as to assess the significance of the relevant impacts:

- Unacceptable loss of threatened or protected vegetation types, habitat or species through clearing, resulting in an impact on the conservation status of such flora, fauna or ecological functioning;
- Unacceptable risk to water features through disturbance associated with construction activities and increased runoff and erosion during the operation phase;
- Unacceptable risk to avifauna through disturbance and collision with the power line;
- Unacceptable loss of heritage resources (including palaeontological and archaeological resources);
- Complete or whole-scale change in sense of place and character of an area and unacceptable visual intrusion.

It is important to explore the potential for cumulative impacts as this will lead to a better understanding of these impacts and the potential for mitigation that may be required. The scale at which the cumulative

impacts are assessed is important. For example, the significance of the cumulative impact on the regional or national economy will be influenced by grid connection infrastructure development throughout South Africa, while the significance of the cumulative impact on visual amenity may only be influenced by grid connection infrastructure developments that are in close proximity to each other and in close proximity to the viewer.

The grid connection corridor assessed for the grid connection infrastructure is located within a Renewable Energy Development Zone (REDZ) (i.e. the Vryburg REDZ), and a Strategic Transmission Corridor (i.e. the Northern Transmission Corridor). These areas form part of the areas identified by the DFFE as geographical areas of strategic importance for the development of commercial renewable energy developments (REDZ) and large scale grid infrastructure development projects (transmission corridors). Therefore, these areas are considered as nodes for the development of renewable energy and grid infrastructure projects.

Figure 8.1 indicates the location of other known grid connection infrastructure related to solar PV facilities, as well as existing grid infrastructure located within the vicinity of the proposed project. Existing grid connection infrastructure in proximity of the Woodhouse Solar PVs Grid Connection includes:

- Mercury-Mookodi 1 400kV power line
- Waterloo- Mookodi 132kV power line
- Mookodi-Ferrum 1 400kV power line
- Delareyville Munic - Vryburg 1 88kV Feeder power line
- Woodhouse 88/22kV Substation
- Bophirma 132kV Substation
- Vryburg 88/11kV Substation
- Waterloo 132kV Substation (substation at the Waterloo PV facility)
- Waterloo-Mookodi 132kV power line

The potential for cumulative impacts resulting from the development of grid connection infrastructure considers the following:

- Cumulative impacts on terrestrial and freshwater ecological processes
- Cumulative impacts on avifauna
- Cumulative impacts on heritage resources
- Cumulative visual impacts

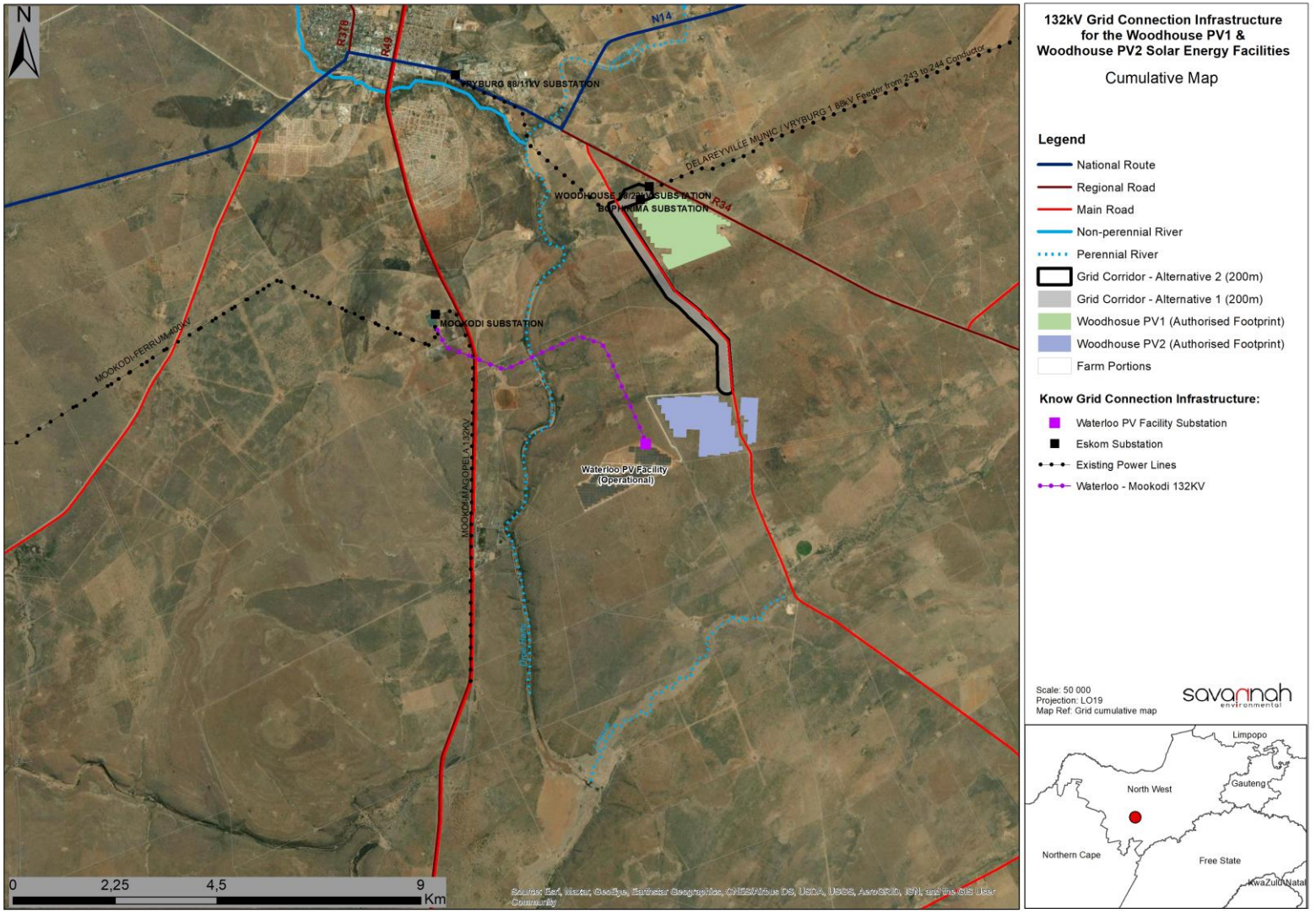

Figure 8.1: Cumulative map for the Woodhouse Solar PVs Grid Connection showing existing grid infrastructure located within the vicinity of the project

8.3. Cumulative Impacts on Ecological Processes

From a terrestrial and freshwater ecology cumulative impacts related to the proposed grid connection infrastructure a most related to the cumulative loss unprotected vegetation types from the broad area may impact the country's ability to meet its conservation targets, and transformation of intact habitat would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity. However, given the nature and extent of the proposed grid connection infrastructure the expected cumulative impact are acceptable in terms of loss and risk, without an unacceptable increase in impact.

Overall, the impacts to ecology for the proposed grid connection infrastructure are considered to be of low significance, while impacts when considering all similar developments would be remain of low significance.

Cumulative Impact 1 (Terrestrial Ecology): *Reduced ability to meet conservation obligations and targets*

Impact Nature: The loss of unprotected vegetation types on a cumulative basis from the broader area impacts the Province's ability to meet its conservation targets.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other grid infrastructure within the area**
Extent	Local (1)	Regional (4)
Duration	Long Term (4)	Long-Term (4)
Magnitude	Small (1)	Small (2)
Probability	Very Improbable (1)	Highly Improbable (2)
Significance	**Low (6)**	**Low (20)**
Status	Slightly Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	Highly unlikely	Unlikely
Can impacts be mitigated?	Yes, to a large extent	
Mitigation » The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas. » Reduce the footprint of the facility within sensitive habitat types as much as possible. » Mitigation measures of the current site should align with neighbouring sites and other developments in the area.		

Cumulative Impact 2 (Terrestrial Ecology): *Impacts on Broad-Scale Ecological Processes*

Impact Nature: Transformation of intact habitat could potentially compromise ecological processes of the Critical Biodiversity and Ecological Support Areas as well as ecological functioning of important terrestrial habitats and would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other grid infrastructure within the area**
Extent	Local (1)	Neighbouring Areas (3)
Duration	Long Term (4)	Long-Term (4)
Magnitude	Small (1)	Minor (3)
Probability	Very Improbable (6)	Improbable (2)
Significance	**Low (6)**	**Low (20)**
Status	Neutral	Slightly Negative
Reversibility	Low	Low

Irreplaceable loss of resources	Highly unlikely	Unlikely
Can impacts be mitigated?	Yes, to a large extent	
Mitigation » The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas. » Position electrical infrastructure in close proximity to existing infrastructure (e.g. existing roads and power lines). » Mitigation measures of the current site should align with neighbouring sites and other developments in the area.		

Cumulative Impact 3 (Terrestrial Ecology): *Compromise ecological processes as well as ecological functioning of important terrestrial habitats.*

Impact Nature: Transformation of intact terrestrial habitats could potentially compromise ecological processes as well as ecological functioning of important habitats and would contribute to habitat fragmentation and potential disruption of habitat connectivity and impair their ability to respond to environmental fluctuations. This in turn may lead to:

» A change in the status of impacted vegetation type, subsequently also reducing the ability to meet national conservation obligations and targets;
» A reduction in biodiversity and even the loss of some species from the area;
» The loss of CBA areas which may lead to the province, being incapable to meet their required biodiversity pattern and process targets.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other grid infrastructure within the area**
Extent	Local (1)	Neighbouring Areas (3)
Duration	Long Term (4)	Long Term (4)
Magnitude	Small (1)	Minor (3)
Probability	Very Improbable (1)	Improbable (2)
Significance	**Low (6)**	**Low (20)**
Status	Negative	Negative
Reversibility	High	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	
Mitigation » The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas. » Position electrical infrastructure in close proximity to existing infrastructure (e.g. existing roads and power lines).		

Cumulative Impact 4 (Freshwater/Aquatic Ecology): *Compromise ecological processes as well as ecological functioning of important freshwater/aquatic habitats.*

Impact Nature: Transformation of intact freshwater resource habitats could potentially compromise ecological processes as well as ecological functioning of important habitats and would contribute to habitat fragmentation and potentially disruption of habitat connectivity and furthermore impair their ability to respond to environmental fluctuations. This is especially of relevance for larger watercourses and wetlands serving as important groundwater recharge and floodwater attenuation zones, important microhabitats for various organisms and important corridor zones for faunal movement

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other grid infrastructure within the area**
Extent	Local (1)	Local (1)
Duration	Long Term (4)	Long Term (4)
Magnitude	Small (1)	Moderate (6)
Probability	Highly Improbable (1)	Highly Improbable (1)
Significance	**Low (7)**	**Low (11)**
Status	Negative	Negative
Reversibility	Moderate	Low
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	

Mitigation

- The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.
- No pylons may be placed within the delineated wetland/drainage habitats; however, the power line may span these features.
- Use as far as possible the existing roads.
- It is recommended that the power line should be placed as close as possible to the provincial gravel road and should rather span the small drainage system than the seepage feature.
- The depression wetland is regarded as a No-Go area and no activities may be allowed within this wetland feature.

8.4. Cumulative Impacts on Avifauna

The impact of grid connection infrastructure relates to habitat loss, disturbance and displacement, mortality, human conflict, collisions with power infrastructure (including power lines) and electrocutions as a result of power lines and power infrastructure. Cumulative avifaunal impacts associated with the development of the Woodhouse Solar PVs grid connection infrastructure in relation to other known grid connection infrastructure is considered acceptable in terms of loss and risk, without an unacceptable increase in impact.

Overall, the impacts to avifauna for the proposed grid connection infrastructure alone are considered to be of low significance, while impacts when considering all similar developments would be of low to medium significance.

Cumulative Impact 1 (Avifauna): Regional losses of natural habitat

Impact Nature: Regional losses of natural habitat and subsequently displacement of birds		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other grid infrastructure within the area**
Extent	Regional (4)	Regional (4)
Duration	Long-term (4)	Long-Term (4)
Magnitude	Small (1)	Moderate (5)
Probability	Very Improbable (1)	Improbable (2)
Significance	**Low (9)**	**Low (26)**
Status	Negative	Negative

Reversibility	Moderate	Low
Irreplaceable loss of resources	Only very slight loss of resources	Yes
Can impacts be mitigated?	Yes, to a large extent.	
Mitigation » Consolidate infrastructure to areas where existing impacts occur (e.g. placing the proposed power line alongside existing power lines and roads). » The development footprint of the various individual facilities must be kept as small as possible and sensitive habitats must be avoided.		

Cumulative Impact 2: Collisions of birds with overhead power line

Impact Nature: Avian collision impacts related to the overhead power lines during operation		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other grid infrastructure within the area**
Extent	Regional (4)	Regional (4)
Duration	Long-term (4)	Long-Term (4)
Magnitude	Minor (3)	Moderate (6)
Probability	Improbable (2)	Probable (3)
Significance	**Low (22)**	**Medium (42)**
Status	Negative	Negative
Reversibility	Low (birds will be injured or killed)	Low (birds will be injured or killed)
Irreplaceable loss of resources	Low	Yes, owing to the potential loss of critically endangered or endangered avifaunal species.
Can impacts be mitigated?	Yes, to some extent	
Mitigation » Apply bird deterrent devices to the power line and make use of "bird-friendly" pylon structures. » Consolidate infrastructure to areas where existing impacts occur (e.g. placing the proposed power line alongside existing power lines and roads). » The development footprint of the various individual facilities must be kept as small as possible and sensitive habitats must be avoided.		

Cumulative Impact 3: Electrocution of birds due to overhead power lines

Impact Nature: Avian electrocution related to the power lines during operation.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other grid infrastructure within the area**
Extent	Regional (4)	Regional (4)
Duration	Long-term (4)	Long-Term (4)
Magnitude	Minor (3)	Moderate (6)
Probability	Improbable (2)	Probable (3)
Significance	**Low (22)**	**Medium (42)**
Status	Negative	Negative
Reversibility	Low (birds will be injured or killed)	Low (birds will be injured or killed)

Irreplaceable loss of resources	Low potential for irreplaceable loss of resources	Yes, owing to the potential loss of critically endangered or endangered avifaunal species.
Can impacts be mitigated?	Yes, to some extent	
Mitigation » Apply bird deterrent devices to the power line and make use of "bird-friendly" pylon structures. » Consolidate infrastructure to areas where existing impacts occur (e.g. placing the proposed power line alongside existing power lines and roads).		

8.6. Cumulative Impacts on Heritage (including archaeology, palaeontology and cultural landscape)

The proposed grid connection will form part of the infrastructure required for the Woodhouse PV 1 and Woodhouse PV 2 solar facilities. Furthermore, the proposed grid connection corridor is located within a corridor of approved renewable energy facilities. In terms of impacts to heritage resources, it is preferred that this kind of infrastructure development is concentrated in one location and is not sprawled across an otherwise culturally significant landscape. The proposed grid connection is therefore unlikely to result in unacceptable risk or loss, nor will the proposed development result in a complete change to the sense of place of the area or result in an unacceptable increase in impact.

Overall, the impacts to all heritage for the proposed grid connection infrastructure alone are considered to be of low significance, while impacts when considering all similar developments would calculate to of low medium significance.

Nature: Cumulative Impact to the sense of place and known archaeological and palaeontological resources		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other grid infrastructure within the area**
Extent	Local (4)	Local (4)
Duration	Medium-term (3)	Long-term (4)
Magnitude	Low (4)	Moderate (5)
Probability	Improbable (2)	Probable (3)
Significance	**Low (16)**	**Medium (30)**
Status (positive or negative)	Neutral	Neutral
Reversibility	High	Low
Irreplaceable loss of resources?	Unlikely	Unlikely
Can impacts be mitigated?	Not Applicable	
Mitigation: No impacts are anticipated and as such, no mitigation is required		

8.7. Cumulative Visual Impacts

The construction of the grid connection infrastructure for the Woodhouse Solar PV 1 and Woodhouse Solar PV 2 Projects may increase the cumulative visual impact of industrial type infrastructure within the region. The proposed Substations and grid corridor Alternative 2 is located adjacent to the Bophirima Substation and associated power lines. It is expected that the existing visual disturbance at this site will largely absorb the potential visual exposure of the proposed substation i.e. the visual amenity of this site has already been compromised.

The Substations and grid corridor Alternative 1 will remove the collector substation further away from these existing visual disturbances, thereby increasing the spread of visual exposure and potentially elevating the cumulative visual impact.

However, overall, the proposed grid connection is unlikely to result in a complete change to the sense of place of the area or result in an unacceptable increase in impact. The anticipated cumulative visual impact of the proposed grid connection infrastructure is expected to be of moderate significance. This is considered to be acceptable from a visual impact perspective.

From a visual perspective the impact on visual quality of the landscape is dependent on the position of the infrastructure. Therefore, the potential cumulative impacts are the alternative grid solutions are separately considered in the following two tables.

Nature of Impact: The potential cumulative visual impact of the grid connection infrastructure on the visual quality of the landscape.		
	Overall impact of the Alternatives 1 considered in isolation (with mitigation)	***Cumulative impact of the project and other grid infrastructure within the area (with mitigation)***
Extent	Local **(2)**	Local **(2)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	High **(8)**
Probability	Probable **(3)**	Highly Probable **(4)**
Significance	Moderate **(42)**	Moderate **(56)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	
Generic best practise mitigation/management measures: Planning: » Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. Operations: » Maintain the general appearance of the servitude as a whole. Decommissioning: » Remove infrastructure not required for the post-decommissioning use. » Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.		
Residual impacts: The visual impact will be removed after decommissioning, provided the grid infrastructure is removed. Failing this, the visual impact will remain.		

Nature of Impact: The potential cumulative visual impact of the grid connection infrastructure on the visual quality of the landscape.		
	Overall impact of the Grid Alternative 2 considered in isolation (with mitigation)	***Cumulative impact of the project and other grid infrastructure within the area (with mitigation)***
Extent	Local **(2)**	Local **(2)**
Duration	Long term **(4)**	Long term **(4)**
Magnitude	High **(8)**	High **(8)**
Probability	Improbable **(2)**	Probable **(3)**

Significance	Low **(28)**	Moderate **(42)**
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Reversible **(1)**	Reversible **(1)**
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No, only best practise measures can be implemented	
Generic best practise mitigation/management measures: Planning: » Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. Operations: » Maintain the general appearance of the servitude as a whole. Decommissioning: » Remove infrastructure not required for the post-decommissioning use. » Rehabilitate all affected areas. Consult an ecologist regarding rehabilitation specifications.		
Residual impacts: The visual impact will be removed after decommissioning, provided the grid infrastructure is removed. Failing this, the visual impact will remain.		

8.8. Conclusion regarding Cumulative Impacts

Cumulative impacts are expected to occur with the development of the Woodhouse Solar PVs Grid Connection throughout all phases of the project life cycle and within all areas of study considered as part of this BA report. The main aim for the assessment of cumulative impacts considering the development of the grid connection infrastructure is to identify associated cumulative impacts and determine whether the development will be acceptable within the landscape proposed for the development, and whether the loss, from an environmental and social perspective, will be acceptable without whole-scale change.

All cumulative impacts associated with the Woodhouse Solar Grid PVs Connection will be of a medium or low significance. The following can be concluded regarding the cumulative impacts of the grid connection infrastructure:

- ***Ecological processes (terrestrial and freshwater):*** Cumulative impacts on habitat and ecological functioning will be of a low significance. There will be no unacceptable loss of habitat or impact to ecological functioning due to the development of the proposed project within the surrounding area.
- **Avifauna:** Cumulative impacts as a result disturbance, displacement and collision ranges from low to medium significance. There will be no unacceptable risk to avifauna or loss of avifauna species due to the proposed project subject to the implementation of the recommended mitigation measures.
- **Heritage (including archaeology, palaeontology and the cultural landscape):** Cumulative impacts on heritage resources relate to direct impacts to heritage resources. The significance of the cumulative impacts will be low-medium. There will be no unacceptable loss of heritage resources associated with the proposed project and other grid infrastructure developments within the surrounding areas.
- **Visual:** Cumulative visual impacts relate to a change in the visual quality of the landscape. The significance of the visual cumulative impacts will be moderate. There will be no unacceptable impact on the visual quality of the landscape associated with the proposed project and grid infrastructure developments within the surrounding areas.

Based on the specialist cumulative assessment and findings, the development of the Woodhouse Solar PVs grid connection infrastructure and its contribution to the overall impact of all existing grid infrastructure to be developed, it can be concluded that the contribution of the project to cumulative impacts will be of a low to medium significance depending on the impact being considered. There are, however, no impacts or risks identified to be of a high significance or considered as unacceptable with the development of the proposed grid connection infrastructure within the assessed grid connection corridor. In addition, no impacts that will result in whole-scale change are expected to occur.

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CHAPTER 9. CONCLUSIONS AND RECOMMENDATIONS

Genesis Eco-Energy Developments (Pty) Ltd proposes the construction and operation of a 132kV power line, switching station and collector substation to connect the authorised Woodhouse Solar 1 and Woodhouse Solar 2 PV energy facilities to the Eskom grid via the existing Bophirima Substation. The grid connection infrastructure includes:

- 132kV Switching station (footprint up to 1ha)
- 132kV power line (within 200m wide corridor)
- Collector substation (footprint up to 1ha)
- 33kV underground cables to connect to the Solar PV energy facilities' substations
- Access roads to substation sites and service tracks (up to 4m wide) where no existing roads are available.

The grid connection corridor is located approximately 5.5km southeast of the town of Vryburg in the Naledi Local Municipality and Dr Ruth Segomotsi Mompati District Municipality, and comprises the following 5 affected properties[11]:

- Farm Waterloo 992
- Portion 2 of Farm Woodhouse 729
- Portion 2 of the Farm Bernauw 674
- Remaining Extent of Portion 56 of the Farm Bernauw 674
- Remaining Extent of Farm Woodhouse 729 / Eskom Servitude Area

A summary of the recommendations and conclusions for the proposed project as determined through the BA process is provided in this Chapter.

9.1. Legal Requirements as per the EIA Regulations, 2014 (as amended), for the undertaking of a Basic Assessment Report

This chapter of the BA Report includes the following information required in terms of Appendix 1: Content of BA reports:

Requirement	Relevant Section
3(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report	A summary of the findings of the specialist studies undertaken for the grid connection corridor has been included in section 9.2.
3(l) an environmental impact statement which contains (i) a summary of the key findings of the environmental impact	An environmental impact statement containing the key findings of the environmental impacts of the Woodhouse

11 The 200m wide grid connection corridor traverses limited sections of the 5 affected properties. This is a comprehensive listing of these properties.

Requirement	Relevant Section
assessment, (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	Solar PVs Grid Connection has been included as section 9.5. An environmental sensitivity and layout map of the grid connection infrastructure has been included as **Figure 9.1** which overlays the assessed grid connection corridor with the sensitive environmental features present within the corridor. A summary of the positive and negative impacts associated with the development of the grid connection infrastructure has been included in section 9.2.
3(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation.	All conditions required to be included in the Environmental Authorisation for the grid connection infrastructure have been included in section 9.6.
3(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	A reasoned opinion as to whether the grid connection infrastructure associated with the Woodhouse Solar PVs Grid Connection should be authorised has been included in section 9.6.

9.2. Environmental Sensitivity of the Assessed Grid Connection Corridor

From the specialist investigations undertaken for the grid connection infrastructure, the following sensitive areas/environmental features have been identified and demarcated within grid connection corridor for both alternative configurations (refer to **Figure 9.1** and **Figure 9.2**, as well as **Appendix L**). The sensitive features would need to be considered by the developer for the location of the grid connection infrastructure within the assessed grid connection corridor.

- A medium sensitivity drainage line is located within the grid connection corridor. It is recommended that the power line spans over this feature, avoiding direct impact on the feature.
- The depression wetland slightly overlaps within the southern section of the grid connection corridor is considered as an area of high sensitivity. Construction of power line pylons are to be avoided in this area, which is possible given the small overlap with the 200m wide corridor, and the feature being able to be avoided by any grid connection infrastructure.
- Heritage features of low significance (Grade IIIc) are located within the grid connection corridor and are required to be considered when placing power line pylons.

9.3. Evaluation of the grid connection infrastructure of the Woodhouse Solar PVs Grid Connection

The preceding chapters of this report together with the specialist studies contained within **Appendices D-F** provide a detailed assessment of the potential impacts that may result from the development of the Woodhouse Solar PVs Grid Connection. This chapter concludes the environmental assessment of the development of the grid connection infrastructure within the grid connection corridor by providing a summary of the results and conclusions of the assessment. In doing so, it draws on the information gathered as part of the BA process, the knowledge gained by the environmental specialists and the EAP, and presents a combined and informed opinion of the environmental impacts associated with the project.

No environmental fatal flaws were identified in the detailed specialist studies conducted, and no impacts of unacceptable significance are expected to occur with the implementation of the recommended

mitigation measures. These measures include, amongst others, the avoidance of sensitive features and the undertaking of monitoring, as specified by the specialists.

The potential environmental impacts associated with the grid connection infrastructure identified and assessed through the BA process include:

» Impacts on ecology (terrestrial and freshwater).
» Impacts on avifauna.
» Impacts on heritage resources, including archaeology and palaeontology.
» Visual impacts on the area as a result of the grid connection infrastructure.

9.2.1 Impacts on Ecology (Terrestrial and Freshwater)

There are no highly sensitive features impacted by the Woodhouse Solar PVs Grid Connection corridor. However, it is recommended that the power line should be placed as close as possible to the Amalia gravel road and should span the identified small drainage system. From the findings of the Ecological Impact Assessment (**Appendix D**) it can be concluded that the grid connection corridor assessed for the development of the grid connection infrastructure is of moderate to low ecological sensitivity. As a result, there are no specific long-term impacts associated with the grid connection infrastructure that cannot be reduced to an acceptable level through mitigation and avoidance. There are no high residual impacts or fatal flaws associated with the development and it can be supported from a terrestrial ecology perspective.

9.2.2 Impacts on Avifauna

Given the level of degradation the level of degradation already present and the lower bird species diversity and abundance recorded in this area, and placement of infrastructure to areas where existing impacts occur (i.e., placing the proposed power line alongside roads), the impacts of the grid connection on avifauna are likely to be of moderate to low significance and no impacts of high significance are expected, with the implementation of mitigation measures.

9.2.3 Impacts on Heritage Resources (including archaeology and palaeontology)

The Heritage Impact Assessment (**Appendix E**) assessed the impact of the grid connection infrastructure on the heritage features (archaeology, palaeontology and cultural landscape) associated with the assessed grid connection corridor.

Nine archaeological sites of low scientific significance (grade IIIC) were identified within the development corridor. Impacts to archaeological and heritage resources are expected to occur during the construction phase of the project, most likely during foundation excavations. However, with the implementation of mitigation measures, the impact to these identified resources is expected to be of Low significance. There are no fatal flaws expected to occur with regards to archaeological resources.

No impact to significant palaeontological heritage is anticipated, and the impact to paleontological resources is expected be of Low significance with and without the implementation of mitigation measures. It is recommended that no additional specialist palaeontological assessment is required.

9.2.4. Visual Impacts

The Visual Impact Assessment (**Appendix F**) identified negative impacts on visual receptors during the construction and the operation phases of the grid connection infrastructure. The impacts include visual impacts due to construction activities, as well as impacts on sensitive visual receptors located within 0.5km to 3km from the grid connection infrastructure, and a visual impact on the sense of place. The Visual Impact Assessment concluded that the visual impact of all grid connection infrastructure will have a low visual impact on observers traveling along the roads and residents of homesteads within a 1.5 - 3km radius of the infrastructure. Furthermore, the anticipated visual impact of the proposed grid connection infrastructure on the regional visual quality (i.e. beyond 3km of the proposed infrastructure), and by implication, on the sense of place, is generally expected to be of low significance.

9.2.5 Assessment of Cumulative Impacts

Based on the specialist cumulative assessment and findings, the development of the Woodhouse Solar PVs grid connection infrastructure and its contribution to the overall impact of all existing grid infrastructure to be developed, it can be concluded that the contribution of the project to cumulative impacts will be of a low to medium significance depending on the impact being considered. There are, however, no impacts or risks identified to be of a high significance or considered as unacceptable with the development of the proposed grid connection infrastructure within the assessed grid connection corridor. In addition, no impacts that will result in whole-scale change are expected to occur.

9.2.6 Consideration of Alternatives

Two alternative collector substation positions were considered as part of this assessment. As such, the 200m wide power line corridor is shared/common for the bulk of its length and deviates only to accommodate these two alternative positions for the Collector substation. This assessment, therefore, considered two alternative grid connection solutions, both originating at the same point, and terminating at Bophirima Substation. As part of specialist assessments both alternative grid connection solutions were assessed and determined to be acceptable from an environmental perspective. A summary of the assessment of impacts for the grid connection and associated infrastructure alternatives are detailed below:

Aspect	Grid Connection Alternative 1	Grid Connection Alternative 2
Ecology	*Preferred & Acceptable*	*Acceptable*
Avifauna	*Preferred & Acceptable*	*Acceptable*
Heritage	*Preferred & Acceptable*	*Acceptable*
Visual	*Acceptable*	*Preferred & Acceptable*

Grid Connection Alternative 1 was identified by the developer as the preferred alternative from a technical feasibility perspective and has been fully considered and assessed as part of this BA process and within this BA Report to be acceptable from an environmental perspective.

9.4. Environmental Costs of the grid connection infrastructure versus Benefits of the grid connection infrastructure

No fatal flaws have been identified to be associated with the proposed project. Environmental costs (including those to the natural, economic and social environment) can, however, be anticipated at a local and site-specific level, and are considered acceptable provided the mitigation measures as outlined in the BA Report and the EMPr are implemented and adhered to. These environmental costs could include:

» *A loss of biodiversity, flora and fauna due to the clearing of land for the construction and utilisation of land for grid connection infrastructure* - The cost of loss of biodiversity is considered to be limited due to the limited footprint of the development and placement of infrastructure within lower sensitivity areas as a result of the selected alternative.
» *Visual impacts associated with the grid connection solution* - The development of the grid connection will have a low visual impact on observers traveling along the roads and residents of homesteads within a 1.5 - 3km radius of the infrastructure. Furthermore, the anticipated visual impact of the proposed grid connection infrastructure on the regional visual quality (i.e., beyond 3km of the proposed infrastructure), and by implication, on the sense of place, is generally expected to be of low significance.
» *A loss of heritage resources* – Heritage resources of low significance area located within the grid connection corridor however the impact is expected to be of low significance with the placement of pylon infrastructure to avoid these resources.

Benefits of the grid connection infrastructure include the following:

» The consolidated grid connection infrastructure will service the connection of two solar PV facilities (known as Woodhouse Solar PV1 and Woodhouse Solar PV2) to the national grid, therefore reducing the amount of grid connection infrastructure required for the developments.
» The project will result in important economic benefits at a local and national scale through an increase in production and GDP-R and employment. These will persist during the construction, operation and decommissioning phases of the project.
» The project indirectly contributes towards the Provincial and Local goals for the development of renewable energy as outlined in the respective IDPs.

The benefits of the Woodhouse Solar PVs Grid Connection solution are expected to occur at a national, regional and local level. As the costs to the environment at a site-specific level have been largely limited through the appropriate placement of the grid connection corridor within areas considered to be acceptable for the development of the grid connection infrastructure, the benefits of the project are expected to outweigh the environmental costs of the grid connection infrastructure.

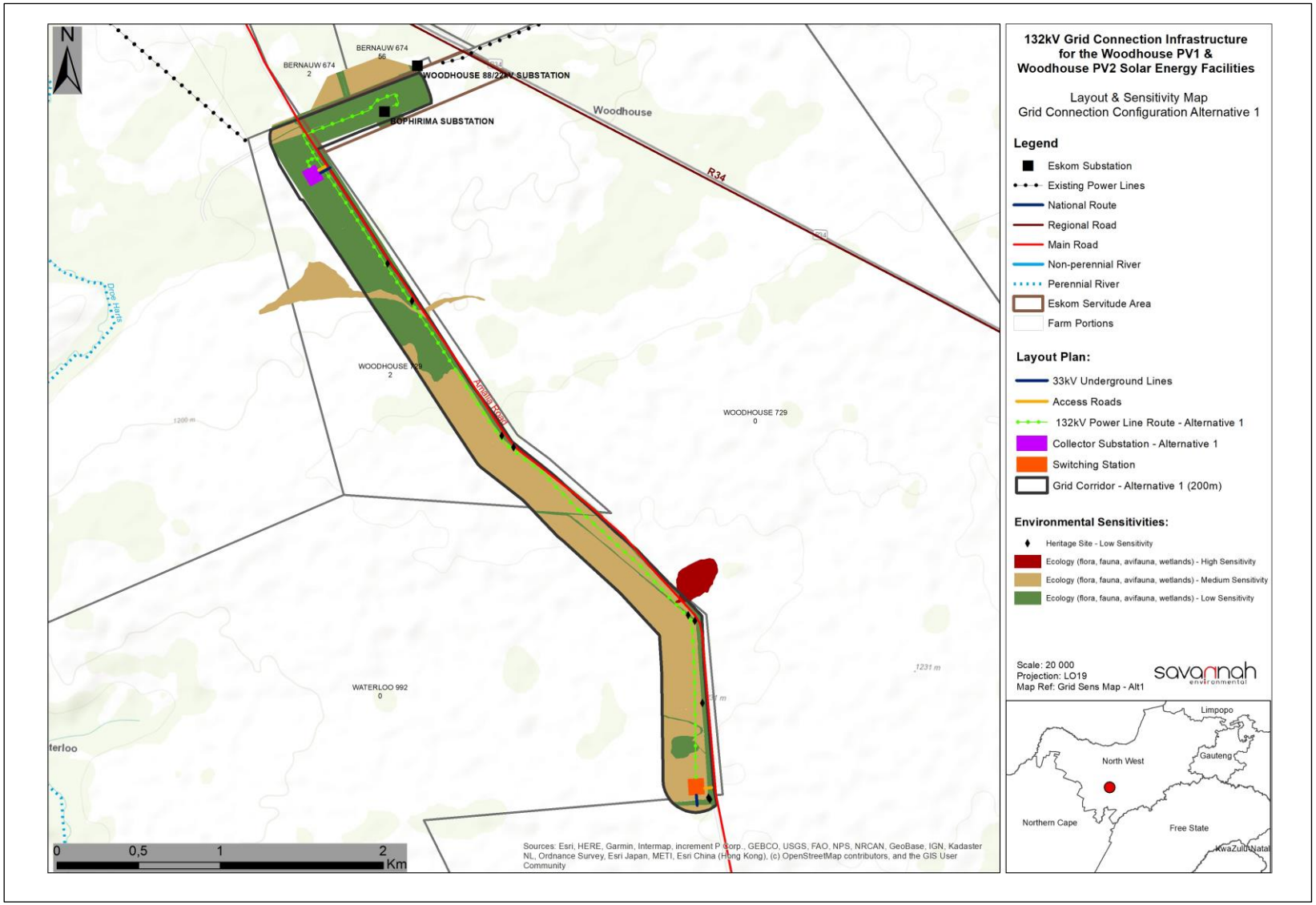

Figure 9.1: Environmental sensitivity map overlain with the assessed grid connection corridor within which the grid connection infrastructure for the Woodhouse Solar PVs Grid Connection alternative configuration 1 is proposed to be developed (**Appendix L**)

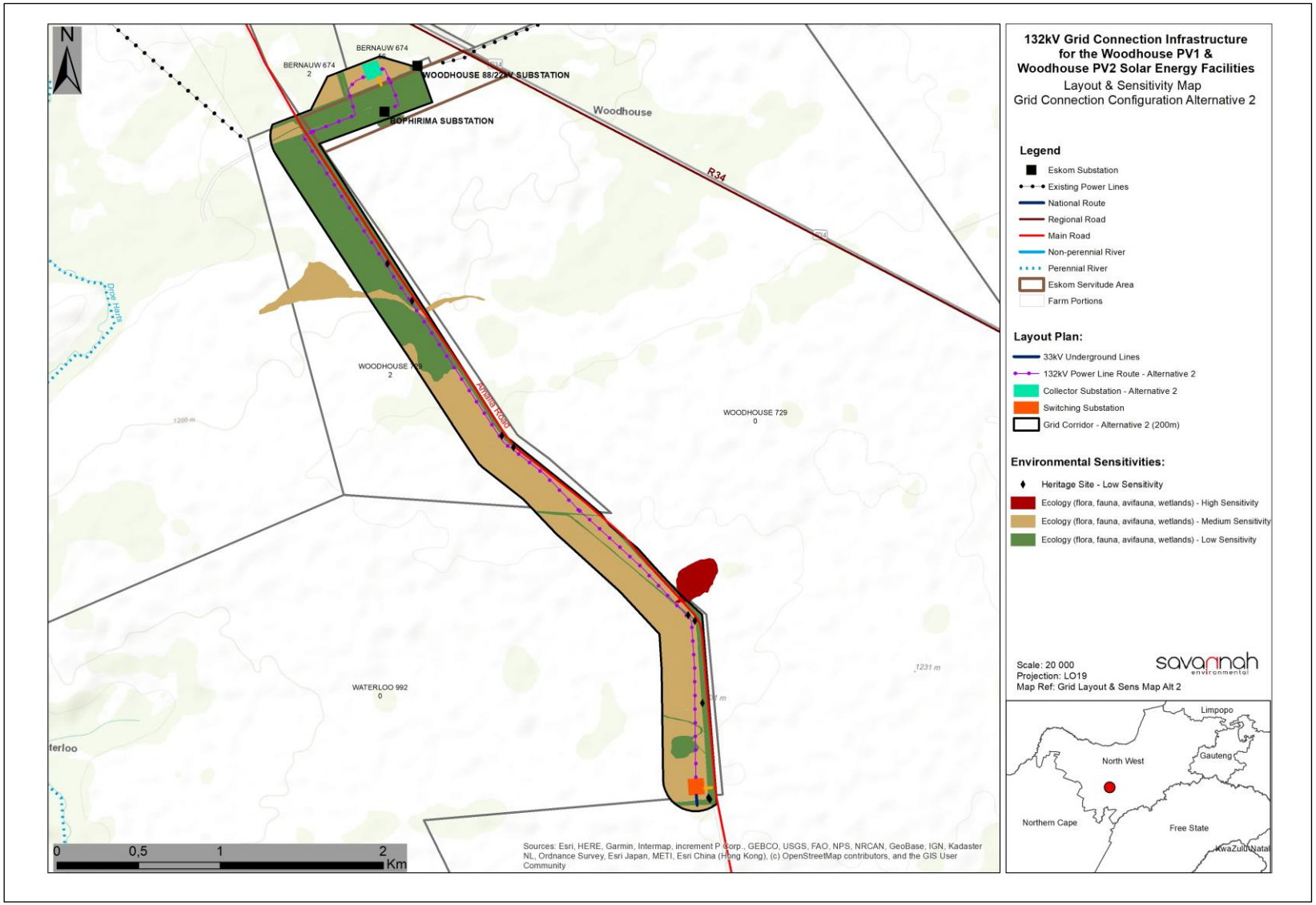

Figure 9.2: Environmental sensitivity map overlain with the assessed grid connection corridor within which the grid connection infrastructure for the Woodhouse Solar PVs Grid Connection alternative configuration 2 is proposed to be developed (**Appendix L**)

9.5. Overall Conclusion (Impact Statement)

Genesis Eco-Energy Developments (Pty) Ltd proposes the construction and operation of a 132kV power line, switching station and collector substation to connect the authorised Woodhouse Solar 1 and Woodhouse Solar 2 PV energy facilities to the Eskom grid via the existing Bophirima Substation. Two alternative Collector substation positions are considered as part of this assessment. As such, the 200m wide power line corridor is shared/common for the bulk of its length and deviates only to accommodate these two alternative positions for the Collector substation. This assessment as well as specialist assessments, therefore, considers two alternative grid connection solutions, both originating at the same point, and terminating at Bophirima Substation.

The specialist findings have indicated that there are no identified environmental fatal flaws or impacts of a high significance (following the implementation of mitigation) associated with the implementation of the grid connection and associated infrastructure, and that both alternative grid connection configurations and associated infrastructure are acceptable. The preferred grid connection option is therefore the technically preferred option. All impacts associated with the project establishment within the grid connection corridor can be mitigated to acceptable levels through the implementation of the recommended mitigation. The preferred layout overlain with the environmental sensitivities is included as **Figure 9.1**.

Through the assessment of the development of the grid connection infrastructure within the grid connection corridor and the implementation of the preferred grid connection option it can be concluded that the proposed project is environmentally acceptable (subject to the implementation of the recommended mitigation measures) with no unacceptable impact significance of whole-scale change.

9.6. Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, the grid connection corridor proposed by the developer, the potential for avoidance of sensitive environmental features within the grid connection corridor on final placement of the grid line, as well as the potential to further minimise the impacts to acceptable levels through mitigation, it is the reasoned opinion of the EAP that the development of the Woodhouse Solar PVs Grid Connection is acceptable within the landscape and can reasonably be authorised to be developed within the assessed grid connection corridor for Grid Connection Alternative 1(refer to **Figure 9.1**). The grid connection corridor is located within the Northern Corridor of the Strategic Transmission Corridors which is one of five corridors identified for the rollout of large-scale electricity transmission and distribution infrastructure. The grid connection corridor is also located within Zone 6 of the Renewable Energy Development Zones (REDZ), otherwise known as the Vryburg REDZ, which has been earmarked for the development of large scale solar photovoltaic energy facilities.

The following infrastructure description and list of infrastructure would be included within an authorisation issued for the project:

» ***Grid Connection Alternative 1:*** A 132kV switching substation located north of the authorised Woodhouse 2 Solar facility, as well as a 132kV power line, positioned to the western side of the Amalia main road, which feeds to Collector Substation Alternative 1. The Collector Substation Alternative 1 is located west of the authorised Woodhouse 1 Solar facility. A 132kV power line will run east from Collector Substation Alternative 1 to connect at Bophirima Substation. The connection to Bophirima

Substation will be at the eastern side of the substation via a 132kV underground power line within the Eskom Servitude Area.

» The key infrastructure for the grid connection described above are as follows:
  - 132kV switching substation (footprint up to 1ha)
  - 132kV power line (within 200m wide corridor)
  - Collector substation (footprint up to 1ha)
  - 33kV underground cables to connect to the Solar PV energy facilities' substations
  - Access roads to substation sites and service tracks (up to 4m wide) where no existing roads are available.

The following key conditions would be required to be included within an authorisation issued for the Woodhouse Solar PVs Grid Connection infrastructure:

» The layout of the grid connection infrastructure must be optimised within the preferred grid connection corridor (Alternative 1), and informed following walk-through surveys by an ecologist and heritage specialist.
» Power line infrastructure must be placed to avoid low significance heritage resources identified within the corridor.
» Power line infrastructure must be placed to avoid and span drainage line features.
» All mitigation measures detailed within this BA Report, as well as the specialist reports contained within **Appendices D to E**, are to be implemented.
» The EMPrs as contained within **Appendix G** to **Appendix I** of this BA Report should form part of the contract with the Contractors appointed to construct and maintain the grid connection infrastructure in order to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the infrastructure is considered key in achieving the appropriate environmental management standards as detailed for this project.
» A chance find procedure must be developed and implemented in the event that archaeological or palaeontological resources are found during the construction of the grid connection infrastructure. In the case where the proposed development activities bring these materials to the surface, work must cease and SAHRA.

CHAPTER 10. REFERENCES

Heritage

Heritage Impact Assessments				
Nid	**Report Type**	**Author/s**	**Date**	**Title**
2147	HIA Phase 1	Johnny Van Schalkwyk	01/06/2012	Heritage impact assessment for the PROPOSED DEVELOPMENT OF PHOTOVOLTAIC POWER PLANTS ON FOUR DIFFERENT LOCATIONS IN NORTH WEST AND NORTHERN CAPE PROVINCES
8372	HIA Phase 1	Johnny Van Schalkwyk	01/10/2008	Heritage Impact Survey Report for the Proposed 400/132 kV Vryburg Substation and Loop-In Lines, North West Province
89376	HIA Phase 1	Johnny Van Schalkwyk	01/10/2012	Heritage impact assessment for the PROPOSED DEVELOPMENT OF A PHOTOVOLTAIC POWER PLANT ON A PORTION OF THE FARM WATERLOO 992, VRYBURG REGION, NORTH WEST PROVINCE
109477	PIA Phase 1	John E Almond	01/01/2013	PALAEONTOLOGICAL HERITAGE ASSESSMENT: COMBINED DESKTOP & FIELD-BASED STUDY Proposed PV Solar Facility on a portion of the farm Waterloo 992 near Vryburg, Naledi Local Municipality, North-West Province
109478	PIA Desktop	John E Almond	01/01/2013	PALAEONTOLOGICAL HERITAGE ASSESSMENT: DESKTOP STUDY Proposed PV Solar Facility on a portion of the farm Rosendal 673 near Vryburg, Naledi Local Municipality, North-West Province
156955	AIA Phase 1	Jaco van der Walt	11/12/2013	Archaeological Impact Assessment for the Proposed Tiger Kloof Photovoltaic Solar Energy Facility near Vryburg, North West Province
156958	Palaeontological Specialist Reports	John E Almond	30/11/2013	Proposed Tiger Skloof Photovoltaic Solar Energy Facility near Vryburg, Naledi Local Municipality, North-West Province
177017	Heritage Impact Assessment Specialist Reports	Johnny Van Schalkwyk	31/08/2014	BASIC HERITAGE ASSESSMENT FOR THE PROPOSED MOOKODI 132KV PHASE 2 POWER LINES DEVELOPMENT, NORTH WEST PROVINCE
358386	Palaeontological Specialist Reports	John Edward Almond		Palaontological Heritage Assessment: Combined Desktop & Field-Based Study: Proposed Gamma Solar Power Plant on the Remaining Extent of Portion 4 (Bos Kop), Farm Champions Kloof 731, North-West Province
358387	Palaeontological Specialist Reports	John Edward Almond		Palaeontological Heritage Assessment: Combined Desktop & flied-Based Study: Proposed Khubu Solar Plant on Portion 5 (Shadow Eve) (Portion of Portion 4|). Farm Champions Kloof 731 near Vryburg. Naledi Local Municipality. North-West Province
358388	Heritage Impact Assessment Specialist Reports	Johnny Van Schalkwyk		Cultural heritage Impact assessment for the Development of the Proposed Khubu Solar Power Plant in the Portion 5 of the Farm CHampions Kloof 731, Vryburg Region, North West Province
343610	Archaeological Specialist Reports	Jaco van der Walt	09/11/2015	Archaeological Scoping Report for the Proposed Woodhouse Solar 1 and Woodhouse Solar 2 PV Facilities close to Vryburg, NW Province
343611	Palaeontological Specialist Reports	Elize Butler	25/09/2015	Palaeontological Impact Assessment of the Proposed Woodhouse PV Solar Energy Facilities and Associated Infrastructure on the Remaining Extent of Farm Woodhouse 729, near Vryburg, NW Province
361091	HIA Phase 1	David Morris	01/04/2014	Appendix D3 Vryburg WWTW Heritage Specialist Report

362237		Johnny Van Schalkwyk	29/01/2016	Cultural heritage impact assessment for THE DEVELOPMENT OF THE PROPOSED GAMMA SOLAR POWER PLANT ON PORTION 4 OF THE FARM CHAMPIONS KLOOF 731, VRYBURG REGION, NORTH WEST PROVINCE
364708	Heritage Impact Assessment Specialist Reports	Wouter Fourie	26/05/2016	75MW SOLAR PHOTOVOLTAIC (PV) ENERGY FACILITY â€“ SENDAWO SOLAR 3 Heritage Impact Assessment
364718	Heritage Impact Assessment Specialist Reports	Wouter Fourie	19/05/2016	SENDAWO POWERLINE ALTERNATIVES â€“ SENDAWO PROJECTS Heritage Impact Assessment
365017	Heritage Impact Assessment Specialist Reports	Johnny Van Schalkwyk	01/03/2016	Cultural heritage impact assessment for THE EXTENSION OF THE PROPOSED SOLAR POWER PLANT ON A PORTION OF THE FARM WATERLOO 992, VRYBURG REGION, NORTH WEST PROVINCE
367821		John Almond	07/01/2013	Palaeontological Heritage Assessment: Combined Desktop & Field-based Study: Proposed PV Solar Facility on a portion of the farm Waterloo 992 near Vryburg, Naldi Local Municipality, North West Province
374639	Archaeological Specialist Reports	Jaco van der Walt	30/04/2016	Archaeological Impact Assessment Report for the proposed Woodhouse 1 Solar PV Facility near Vryberg, North West Province
374641	Palaeontological Specialist Reports	Elize Butler	10/04/2016	Palaeontological Impact Assessment Report for the proposed Woodhouse 1 Solar PV Facility near Vryberg, North West Province
374673	Archaeological Specialist Reports	Jaco van der Walt	30/04/2016	Archaeological Impact Assessment Report for the proposed Woodhouse 2 Solar PV Facility near Vryberg, North West Province
374960	Palaeontological Specialist Reports	Elize Butler	10/04/2016	Palaeontological Impact Assessment Report for the proposed Woodhouse 2 Solar PV Facility near Vryberg, North West Province

Visual

Chief Directorate National Geo-Spatial Information, varying dates. 1:50 000 Topo-cadastral Maps and Data.

CSIR, 2017. Delineation of the first draft focus areas for Phase 2 of the Wind and Solar PV Strategic Environmental Assessment.

CSIR, 2015. The Strategic Environmental Assessment for wind and solar photovoltaic energy in South Africa.

DEA, 2018. National Land-cover Database 2018 (NLC2018).

DEA, 2021. South African Protected Areas Database (SAPAD_OR_2021_Q1).

DEA, 2021. South African Renewable Energy EIA Application Database (REEA_OR_2021_Q1).

DEA&DP, 2011. Provincial Government of the Western Cape. Guideline on Generic Terms of Reference for EAPS and Project Schedules.

Department of Environmental Affairs and Tourism (DEA&T), 2001. Environmental Potential Atlas (ENPAT) for the North West Province.

JAXA, 2021. Earth Observation Research Centre. ALOS Global Digital Surface Model (AW3D30).

National Botanical Institute (NBI), 2004. Vegetation Map of South Africa, Lesotho and Swaziland (Unpublished Beta Version 3.0)

Oberholzer, B. (2005). Guideline for involving visual and aesthetic specialists in EIA processes: Edition 1.

The Environmental Impact Assessment Amendment Regulations. In Government Gazette Nr. 33306, 18 June 2010.